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LABORATORY  
OF THE  
INLAND REVENUE DEPARTMENT,  
OTTAWA, CANADA.  
1902.

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BULLETIN No. 81.

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FERTILIZERS.

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# LABORATORY

## OF THE

### INLAND REVENUE DEPARTMENT.

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#### BULLETIN No. 81.

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#### FERTILIZERS.

OTTAWA, June 26, 1902.

W. J. GERALD, Esq.,  
Deputy Minister of Inland Revenue.

SIR,—In accordance with the provisions of the Fertilizers Act, 1890, which requires manufacturers or importers to transmit standard samples to the Department of the goods they propose to sell in Canada, 106 such samples were received from the past year and have been analysed in this laboratory. Table I., accompanying this Bulletin, gives the results of examining these standard samples, together with the statements of their manufacturers or importers. The commercial names of the various brands, statements as regards the materials from which they were produced, and the guaranteed analyses of the manufacturers will also be found recorded in Table I. It will be observed that the upper line opposite each brand gives the percentages of fertilizing constituents guaranteed by the manufacturers, and the lower line the results of the analyses carried out in this laboratory. As required by the Act the table also contains a column in which 'the relative value of each fertilizer calculated from its contents in fertilizing ingredients is given,' the prices of these ingredients being as follows:—

	Cents per pound.
Nitrogen in salts of ammonia or nitrates.....	13
Organic nitrogen in ground bone, fish, blood or tankage...	12
Phosphoric acid, soluble in water.....	6
"    soluble in a 1 p.c. solution of citric acid.....	5½
"    insoluble, in Thomas' Phosphate Powder.....	3½
"    insoluble, in ground rock phosphate or in compound fertilizers.....	1½
Potash, contained in wood ashes.....	6
"    from high grade potash salts.....	5½

Besides Table I. there is also attached to this report a tabulated statement giving the results of obtaining samples of fertilizers in the open market. The collection was made, in accordance with your instructions, in the months of March and April last, and all the information obtained, as well as the results of submitting them to the district analysts for examination, are given in Table II. It will be observed with regard to each of these 'fertilizers as sold' that, in most cases, there are three lines of figures opposite the description of each sample. The uppermost of these shows the contents guaranteed by the manufacturer; the next lower line gives the percentage of fertilizing constituents found in the standard sample, and the lowest line gives the same percentages as found by the district analysts in the sample collected. In cases where no standard samples have been submitted to the department, and, nevertheless, in contravention of the Fertilizers Act, the brands in question have been offered for sale, the two upper lines will, of course, show no figures. The number of such samples of fertilizers, not registered and therefore illegally sold, and to which I called your attention in a report dated April 28, 1902, amounts to ten, which, compared with the number of similar samples in 1901 (eleven), does not show much improvement. In such cases it has been customary heretofore to warn offending parties, but this does not seem to have the effect of preventing these contraventions of the Fertilizers Act, and I have to submit for your consideration the question as to whether some more severe method of dealing with such infractions should not be resorted to.

According to the opinions expressed by the district analysts, five out of the 85 samples collected have been found to be adulterated, being deficient in available phosphoric acid or other fertilizing constituents, while eight others have been characterized as being 'below guarantee.' This is not quite such a favourable showing as that of last year.

I beg to recommend the publication of this report, with the tables attached to it, as well as the 'Memoranda on Manures' which it is customary to print at the same time.

I have the honour to be, Sir

Your obedient servant,

THOMAS MACFARLANE,

*Chief Analyst.*

TABLE I.—Statement of the Results of Examining 106 Standard

Number of Sample.	Name of Manufacturer.	By whom sent.	From what Materials Produced.	Name or Brand of Fertilizer.
1250	The American Agricultural Chemical Co., Boston, Mass.	Manufacturers		'Bradley's B. D. Sea Fowl Guano'— Guaranteed ..... Found .....
1251	" " "	"		'Bradley's Complete Manure for Potatoes and Vegetables'— Guaranteed ..... Found .....
1252	Canadian Pacific Fish Oil and Guano Co., Ladner, B.C.	"		'Guano or Fish Fertilizer'— Guaranteed ..... Found .....
1253	The William Davies Co., Ltd., Toronto.	"	Dried blood, bones and tankage.	Fertilizer 'Exhibit A'— Guaranteed ..... Found .....
1254	The Harris Abattoir Co., Ltd., Toronto.	"	" "	Fertilizer 'Exhibit A'— Guaranteed ..... Found .....
1255	Ingersoll Packing Co. Ingersoll, Ont.	"	Blood, tankage and bone from the hog.	'Ingersoll Fertilizer'— Guaranteed ..... Found .....
1256	The Nichols Chemical Co., Ltd., Capelton, P.Q.	"		'Capelton Brand'— Guaranteed ..... Found .....
1257	" " "	"		'The Royal Canadian'— Guaranteed ..... Found .....
1258	" " "	"	Phosphate rock, sulphuric acid, sulphate of ammonia and muriate of potash.	'The Victor'— Guaranteed ..... Found .....
1259	" " "	"		'The Reliance'— Guaranteed ..... Found .....
1260	" " "	"		'No. 1 Brand'— Guaranteed ..... Found .....
1261	" " "	"		'Our Crown Brand'— Guaranteed ..... Found .....
1262	The American Agricultural Chemical Co., Great Eastern Fertilizer Branch, Rutland, Vt.	Great Eastern Fertilizer Branch, Rutland, Vt.		'Great Eastern Northern Corn Special'— Guaranteed ..... Found .....
1263	" " "	" "		'Great Eastern Potato Manure'— Guaranteed ..... Found .....
1264	" " "	" "		'Great Eastern General'— Guaranteed ..... Found .....
1265	" " "	" "		'Great Eastern Grass and Oats'— Guaranteed ..... Found .....
1266	The American Agricultural Chemical Co., Bradley Fertilizer Works, Boston, Mass.	"		'Plain Superphosphate'— Guaranteed ..... Found .....

## Samples of Commercial Fertilizers, registered for 1902.

RESULTS OF ANALYSIS.										Relative value per ton of 2,000 lbs.	Sample Number.
Nitrogen.		Phosphoric Acid.					Potash.	Moisture.			
Total including that of Nitric Acid or Ammonia, if present.	Total calculated as Ammonia.	Soluble in Water.	Citric Soluble.	In-soluble.	Total.	Total Available.					
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	\$ cts.		
2.06	2.50	6.00	2.00	1.00	9.00	8.00	1.50	.....	16.22	1250	
2.46	2.97	5.20	3.95	1.30	10.45	9.15	2.45	7.20	19.45		
3.29	4.00	6.00	2.00	1.00	9.00	8.00	7.00	.....	24.95	1251	
3.99	4.84	8.45	2.04	1.25	11.74	10.49	6.80	10.00	29.47		
10.46	12.70	1.10	8.60	6.70	16.40	9.70	Traces.	3.50	37.80	1252	
6.78	8.23	3.99	4.82	3.99	12.80	8.81	2.24	5.40	29.91		
7.22	8.76	.....	.....	.....	17.06	.....	.....	7.22	.....	1253	
6.36	7.73	0.96	12.29	2.04	15.29	13.25	0.65	7.58	32.65		
7.52	9.13	.....	.....	.....	5.74	.....	.....	13.10	.....	1254	
8.14	9.89	0.45	4.54	1.08	6.07	4.99	0.33	12.36	26.50		
.....	9.60	.....	.....	.....	11.20	10.40	0.64	8.10	.....	1255	
6.41	7.80	Trace.	10.68	4.00	14.68	10.68	0.52	9.23	31.68		
.....	.....	.....	.....	.....	.....	8.00	.....	.....	.....	1256	
0.29	0.36	8.95	1.86	4.48	15.29	10.81	1.00	14.60	15.90		
.....	4.00	.....	.....	.....	.....	9.00	5.00	.....	.....	1257	
4.01	4.87	9.30	0.60	3.20	13.10	9.90	6.64	6.92	29.37		
.....	2.00	.....	.....	.....	.....	7.00	3.00	.....	.....	1258	
2.58	3.13	8.55	1.30	3.90	13.75	9.85	4.58	11.25	24.85		
.....	2.00	.....	.....	.....	.....	6.00	2.00	.....	.....	1259	
2.48	3.01	5.97	1.74	3.96	11.67	7.71	3.44	10.78	19.84		
.....	.....	.....	.....	.....	.....	11.50	.....	.....	.....	1260	
.....	.....	11.83	1.19	3.20	16.22	13.02	0.46	10.85	16.95		
.....	2.00	.....	.....	.....	.....	11.00	2.50	.....	.....	1261	
3.20	3.89	10.91	1.50	3.20	15.61	12.41	3.46	8.73	27.00		
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1262	
2.06	2.50	5.00	3.00	1.00	9.00	8.00	2.00	.....	16.41		
2.25	2.73	4.95	6.67	1.08	12.70	11.62	1.81	10.50	20.90		
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1263	
2.06	2.50	5.00	3.00	1.00	9.00	8.00	3.00	.....	17.90		
1.80	2.30	6.39	3.53	1.27	11.19	9.92	3.36	10.25	20.00		
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1264	
0.82	1.00	5.00	3.00	1.00	9.00	8.00	4.09	.....	16.07		
1.30	1.58	4.33	6.93	0.79	12.05	11.26	4.24	10.40	20.63		
.....	.....	11.00	.....	1.00	12.00	11.00	2.00	.....	.....	1265	
0	0	7.00	3.71	1.44	12.15	10.71	2.57	13.30	15.61		
.....	.....	11.00	3.00	1.00	15.00	14.00	.....	.....	16.80	1266	
.....	.....	9.00	2.16	2.56	13.72	11.16	.....	13.10	13.95		

TABLE I.—Statement of the Results of Examining 106 Standard

Number of Sample.	Name of Manufacturer.	By whom sent.	From what Materials Produced.	Name or Brand of Fertilizer.
1267	The American Agricultural Chemical Co., Great Eastern Fertilizer Branch, Rutland, Vt.	Manufacturers		'William & Clark's Americus Potato Manure'— Guaranteed ..... Found .....
1268	" " "	"		'William & Clark's Americus Corn Phosphate'— Guaranteed ..... Found .....
1269	" " "	"		'William & Clark's Royal Bone Phosphate for all Crops'— Guaranteed ..... Found .....
1270	" " "	"		'Pacific Potato Special'— Guaranteed ..... Found .....
1271	" " "	"		'Pacific Nobesque Guano'— Guaranteed ..... Found .....
1272	" " "	"		'Pacific Fine Ground Bone'— Guaranteed ..... Found .....
1273	" " "	"		'Soluble Pacific Guano'— Guaranteed ..... Found .....
1274	" " "	"		'Tucker's Imperial Bone Superphosphate'— Guaranteed ..... Found .....
1275	" " "	"		'Cleveland Fertilizer for all Crops'— Guaranteed ..... Found .....
1276	" " "	"		'Bradley's Eclipse Phosphate'— Guaranteed ..... Found .....
1277	The American Agricultural Chemical Co., Bradley Fertilizer Works, Boston, Mass.	"		'Bradley's XL Superphosphate'— Guaranteed ..... Found .....
1278	" " "	"		'Bradley's Potato Fertilizer'— Guaranteed ..... Found .....
1279	" " "	"		'Bradley's Farmer's New Method Fertilizer'— Guaranteed ..... Found .....
1280	" " "	"		'Bradley's Niagara Phosphate'— Guaranteed ..... Found .....
1281	" " "	"		'Bradley's Fine Ground Bone'— Guaranteed ..... Found .....
1282	" " "	"		'Read's Leader Blood and Bone'— Guaranteed ..... Found .....



## Samples of Commercial Fertilizers, registered for 1902—Continued.

RESULTS OF ANALYSIS.										Relative value per ton of 2,000 lbs.	Number of Sample.
Nitrogen.		Phosphoric Acid.					Potash.	Moist- ure.			
Total including that of Nitric Acid or Ammonia, if present.	Total calculated at Ammonia.	Soluble in Water.	Citric Soluble.	In- soluble.	Total.	Total avail- able.					
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	\$ cts.		
2.06 3.00	2.50 4.28	5.00 6.71	3.00 2.44	2.00 2.04	10.00 11.29	8.00 9.15	3.00 3.34	..... 13.50	17.90 23.67	1267	
2.06 2.22	2.50 2.72	5.00 7.99	3.00 0.87	2.00 3.20	10.00 12.06	8.00 8.86	1.50 1.31	..... 13.40	16.41 18.22	1268	
1.03 1.40	1.25 1.70	6.00 5.44	2.00 2.05	2.00 3.00	10.00 10.40	8.00 7.40	2.00 1.67	..... 15.00	14.67 14.79	1269	
2.06 2.04	2.50 2.48	5.00 5.25	3.00 3.20	2.00 2.24	10.00 10.00	8.00 8.45	3.00 4.17	..... 14.05	17.90 19.77	1270	
1.03 1.37	1.25 1.66	6.00 7.36	2.00 1.53	2.00 2.56	10.00 11.45	8.00 8.89	2.00 2.49	..... 14.90	14.67 17.18	1271	
2.50 2.06	3.00 2.51	Trace.	16.44	7.99	21.00 24.43	10.44	0.29	..... 4.70	31.31	1272	
2.06 2.25	2.50 3.94	5.00 6.39	3.00 2.18	2.00 4.28	10.00 12.85	8.00 8.57	1.50 1.72	..... 13.25	16.41 20.96	1273	
1.03 1.36	1.25 1.66	6.00 5.44	2.00 3.53	2.00 2.33	10.00 11.00	8.00 8.64	2.00 2.29	..... 12.95	14.67 16.38	1274	
1.03 1.56	1.25 1.90	6.00 6.39	2.00 2.28	2.00 2.36	10.00 11.03	8.00 8.67	2.00 2.30	..... 10.85	14.67 17.05	1275	
1.03 1.37	1.25 1.66	6.00 5.76	2.00 2.81	2.00 2.87	10.00 11.44	8.00 8.57	2.00 2.32	..... 16.15	14.67 16.59	1276	
2.06 1.81	2.50 2.15	5.00 6.07	3.00 2.82	2.00 3.32	10.00 12.21	8.00 8.89	1.50 1.83	..... 12.20	16.41 17.64	1277	
2.06 1.95	2.50 2.36	5.00 5.78	3.00 3.35	2.00 1.92	10.00 11.03	8.00 9.11	3.00 3.46	..... 13.85	17.90 19.48	1278	
1.03 1.34	1.25 1.43	6.00 6.07	2.00 2.28	2.00 3.00	10.00 11.35	8.00 8.35	2.00 2.54	..... 15.45	14.67 17.58	1279	
0.82 0.88	6.00 1.07	5.00 6.10	2.00 1.58	1.00 2.87	8.00 10.55	7.00 7.68	6.00 1.56	..... 15.70	11.52 13.67	1280	
2.50 3.38	3.00 4.11	0.00	15.58	9.46	21.00 25.04	15.58	.....	.....	34.71	1281	
0.82 1.41	1.00 1.87	5.00 5.59	2.00 2.00	1.00 3.08	8.00 10.62	7.00 7.59	1.00 1.54	..... 14.65	11.52 14.82	1282	



TABLE I.—Statement of the Results of Examining 106 Standard

Number of Sample.	Name of Manufacturer.	By whom sent.	From what Materials Produced.	Name or Brand of Fertilizer.
1283	The American Agricultural Chemical Co., Bradley Fertilizer Works, Boston, Mass.	Manufacturers		'Read's Standard Superphosphate'— Guaranteed ..... Found .....
1284	" " "	" "		'Read's Practical Potato Special'— Guaranteed ..... Found .....
1285	" " "	" "		'Read's Farmer's Friend'— Guaranteed ..... Found .....
1286	" " "	" "		'Read's Sure Catch Fertilizer'— Guaranteed ..... Found .....
1287	" " "	" "		'Quinnipiac Potato Phosphate'— Guaranteed ..... Found .....
1288	" " "	" "		'Quinnipiac Climax Phosphate for all Plants'— Guaranteed ..... Found .....
1289	" " "	" "		'Quinnipiac Mohawk Fertilizer'— Guaranteed ..... Found .....
1290	" " "	" "		'Cumberland Superphosphate'— Guaranteed ..... Found .....
1291	" " "	" "		'Cumberland Potato Fertilizer'— Guaranteed ..... Found .....
1292	" " "	" "		'Cumberland Fine Ground Bone'— Guaranteed ..... Found .....
1293	Chemical Works, late H. & E. Albert, London, Eng.	"		Thomas' Phosphate Powder— Guaranteed ..... Found .....
1294	The Laing Packing and Provision Co., Ltd., Montreal.	"	Offal, bone and tankage from the hog.	'Fertilizer'— Guaranteed ..... Found .....
1295	The Provincial Chemical Fertilizer Co., St. John, N.B.	"		'Imperial Superphosphate'— Guaranteed ..... Found .....
1296	" " "	"		'Potato Phosphate'— Guaranteed ..... Found .....
1297	" " "	"		'Victor Guano'— Guaranteed ..... Found .....
1298	" " "	"		'Fruit Tree Fertilizer'— Guaranteed ..... Found .....
1299	" " "	"		'Bone Meal'— Guaranteed ..... Found .....

## Samples of Commercial Fertilizers registered for 1902—Continued.

RESULT OF ANALYSIS.										Relative value per ton of 2,000 lbs.	Number of Sample.
Nitrogen.		Phosphoric Acid.					Potash.	Moist- ure.			
Total, including that of Nitric Acid or Ammonia, if present.	Total calculated as Ammonia.	Soluble in Water.	Citric Soluble.	In- soluble.	Total.	Total Avail- able.					
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	8 cts.		
0.82 1.27	1.00 1.54	5.00 6.52	3.00 1.67	2.00 3.19	10.00 11.38	8.00 8.19	4.00 4.30	..... 11.70	16.07 18.32	1283	
0.82 1.76	1.00 2.14	2.00 4.00	2.00 2.75	1.00 2.39	5.00 9.14	4.00 6.75	8.00 7.82	..... 6.37	15.27 20.98	1284	
2.06 2.20	2.50 2.70	5.00 7.67	3.00 0.97	2.00 2.55	10.00 11.19	8.00 8.64	3.00 3.03	..... 13.15	17.99 19.50	1285	
0.23 .....	0.28 .....	6.00 6.87	4.00 3.21	1.00 2.07	11.00 12.15	10.00 10.08	2.00 2.51	..... 13.40	15.58	1286	
2.06 1.87	2.50 2.28	5.00 5.87	3.00 2.30	2.00 2.55	10.00 11.32	8.00 8.77	3.00 3.10	..... 13.55	17.99 18.75	1287	
1.03 1.09	1.25 1.32	6.00 5.11	2.00 3.85	2.00 2.23	10.00 11.19	8.00 8.96	2.00 2.53	..... 13.90	14.67 16.32	1288	
0.82 1.13	1.00 1.37	5.00 5.11	2.00 1.93	1.00 1.91	8.00 8.95	7.00 7.04	1.00 1.25	..... 16.05	11.52 12.94	1289	
2.06 2.34	2.50 2.84	5.00 6.84	3.00 1.37	2.00 3.52	10.00 11.73	8.00 8.21	1.50 1.60	..... 13.80	16.41 18.08	1290	
2.06 2.17	2.50 2.63	5.00 6.52	3.00 1.08	2.00 3.33	10.00 10.93	8.00 7.60	3.00 2.56	..... 14.30	17.99 17.91	1291	
2.50 3.64	3.00 4.42	.....	.....	.....	21.00 24.06	.....	.....	.....	.....	1292	
.....	.....	.....	15.87	8.19	.....	15.87	0.21	6.30	34.61	1292	
.....	.....	.....	13.53	4.13	17.00 17.66	13.53	.....	0.17	17.77	1293	
4.12 4.70	5.00 5.69	1.00	8.55	3.53	14.71 13.08	9.55	.....	5.52 5.75	25.42	1294	
2.31 2.39	2.80 2.90	.....	2.70 2.25	7.88 7.03	17.77 16.95	9.89 9.92	2.02 2.64	..... 9.55	.....	1295	
2.80 2.50	3.40 3.03	.....	1.92 2.89	7.22 5.43	15.62 15.03	8.40 9.60	7.55 7.72	..... 7.20	22.30 26.96	1296	
1.77 2.56	2.15 3.11	.....	3.35 2.82	8.17 6.59	17.32 16.25	9.15 9.66	1.55 3.42	..... 9.85	23.02	1297	
2.82	3.21 3.43	.....	3.54 2.56	3.83 5.44	14.07 15.35	6.70 9.91	5.77 4.60	..... 3.95	24.96	1298	
4.68 2.97	5.68 3.60	.....	.....	.....	24.28 19.64	.....	.....	.....	.....	1299	
.....	.....	13.57	6.07	.....	13.57	.....	5.50	28.13	.....	1299	

TABLE I.—Statement of the Results of Examiners 106 Standard

Number of Sample.	Name of Manufacturer.	By whom sent.	From what Materials produced.	Name or Brand of Fertilizers.
1300	W. Harris & Co., Manufacturers. Danforth Ave. Toronto.			Brand 'H'— Guaranteed ..... Found .....
1301	" " " "	"		'Bone Meal'— Guaranteed ..... Found .....
1302	The Standard Fertilizer and Chemical Co., Ltd., Smith's Falls, Ont.	"		'Special Fertilizer'— Guaranteed ..... Found .....
1303	" " " "	"	Nitrate of soda, sulphate of ammonia, potash and magnesia salts, mineral superphosphate, bone char and fine bone meal.	'No. 1 Fertilizer'— Guaranteed ..... Found .....
1304	" " " "	"		'Standard Fertilizer'— Guaranteed ..... Found .....
1305	" " " "	"		'Corn and Grass Fertilizer'— Guaranteed ..... Found .....
1306	" " " "	"		'Royal Fertilizer'— Guaranteed ..... Found .....
1307	" " " "	"		'Superphosphate of Lime'— Guaranteed ..... Found .....
1308	" " " "	"	Made from mineral phosphate.	'Bone Meal'— Guaranteed ..... Found .....
1309	" " " "	"		'Nitrate of Soda'— Guaranteed ..... Found .....
1310	W. Faint, Peterboro', Ont.	"		'Bone Meal'— Guaranteed ..... Found .....
1311	The Palmerston Pork Packing Co., Palmerston, Ont.	"		'Tankage'— Guaranteed ..... Found .....
1312	The W. A. Freeman Co., Ltd., Hamilton, Ont.	"		'Freeman's Pure Bone Meal'— Guaranteed ..... Found .....
1313	" " " "	"		'Freeman's Sure Growth Manure'— Guaranteed ..... Found .....
1314	" " " "	"		'Freeman's Potato Manure'— Guaranteed ..... Found .....
1315	" " " "	"	Bone, tankage, blood, phosphate, muriate of potash, sulphate of potash, nitrate of soda, sulphate of ammonia and sulphuric acid.	'Freeman's Bone and Potash'— Guaranteed ..... Found .....
1316	" " " "	"		'Freeman's Celery and Early Vegetable Manure'— Guaranteed ..... Found .....
1317	" " " "	"		'Freeman's Tankage Manure'— Guaranteed ..... Found .....
1318	" " " "	"		'Freeman's Tobacco Manure'— Guaranteed ..... Found .....
1319	" " " "	"		'Freeman's Phosphate Powder'— Guaranteed ..... Found .....

Samples of Commercial Fertilizers, registered for 1902—*Continued.*

RESULTS OF ANALYSIS.										Number of Sample.
Nitrogen.		Phosphoric Acid.					Potash.	Moisture.	Relative value per ton of 2,000 lbs.	
Total, including that of Nitric Acid or Ammonia, if present.	Total calculated as Ammonia.	Soluble in Water.	Citric Soluble.	In-soluble.	Total.	Total available				
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	\$ cts.	
6.02	8.68 7.31	1.27	7.66	3.19	9.11 12.12	9.11 8.93	0.65	8.21 1.95	28 27	1300
5.02	4.76 6.10		12.23	4.15	20.14 16.38	12.23	0.38	7.16 0.65	30 05	1301
3.32	3.50 4.04	8.12	0.90	1.28	10.06 10.30	8.00 9.02	6.00 7.39	9.20	26 85	1302
1.76	2.00 2.14	7.67	1.68	3.99	11.00 13.34	9.00 9.35	1.00 2.33	9.85	18 92	1303
2.67	2.50 3.24	9.72	1.16	1.91	11.00 12.79	9.00 10.88	2.00 2.78	8.95	22 84	1304
2.49	2.00 3.02	7.80	0.83	1.92	9.00 10.55	7.00 8.63	4.00 4.92	8.85	22 00	1305
1.64	2.00 1.98	8.13	1.91	1.92	9.00 11.96	8.00 10.04	3.00 3.45	7.65	20 54	1306
0.11	0.13	12.47	0.49	3.51	16.00 16.47	14.00 12.96		10.30	16 83	1307
4.22	4.00 5.13		16.32	5.43	22.00 21.75	16.32		6.60	33 51	1308
14.98	19.00 17.79							0.70	38 95	1309
5.06	6.15		9.92	10.88	20.80	9.92		6.65	33 93	1310
5.51	6.69	Trace.	10.83	2.60	13.43	10.83	1.04	3.00	28 83	1311
5.04	3.00 6.12		11.52	7.80	23.00 19.32	11.52	0.11	7.70	32 69	1312
4.00	3.50 4.86	5.44	2.38	3.84	8.00 11.66	7.82	3.00 5.79	9.20	25 98	1313
2.76	3.00 3.35	4.95	3.04	3.67	8.00 11.66	7.99	5.00 4.54	10.40	21 77	1314
2.60	2.00 3.16	5.69	1.30	3.67	9.00 10.56	6.89	6.00 6.50	10.50	22 31	1315
5.29	6.00 6.33	4.48	1.47	3.33	9.00 9.28	5.95	6.00 7.15	8.40	23 21	1316
5.44	5.00 6.61		9.91	2.24	12.00 12.15	9.91	Trace.	4.35	26 20	1317
5.81	6.00 7.05	5.25	2.23	2.24	7.00 9.72	7.48	7.00 7.15	8.75	30 87	1318
Trace.		12.60	0.19	3.97	15.00 16.76	12.79	Trace.	8.25	16 52	1319

TABLE I.—Statement of the Results of Examining 106 Standard

Number of Sample.	Name of Manufacturer.	By whom sent.	From what Materials Produced.	Name or Brand of Fertilizer.
1320	The American Agricultural Chemical Company.	Buffalo Sales Dept., Buffalo, N.Y.		'Crocker's Wheat and Corn Fertilizer'— Guaranteed..... Found.....
1321	" "	" "		'Crocker's Cabbage and Potato Manure'— Guaranteed..... Found.....
1322	" "	" "		'Crocker's Harvest Jewel Fertilizer'— Guaranteed..... Found.....
1323	" "	" "		'Bradley's Complete Manure for potatoes and Vegetables'— Guaranteed..... Found.....
1324	" "	" "		'Bradley's New Method Fertilizer'— Guaranteed..... Found.....
1325	" "	" "		'Bradley's B.D. Sea Fowl Guano'— Guaranteed..... Found.....
1326	Thos. Reid, St. John, N.B.	Manufacturers		'Superphosphate'— Guaranteed..... Found.....
1327	Bowker Fertilizer Co., 43 Chatham St., Boston, Mass.	" "	Made from bone, bone black, phosphatic guano, bone phosphates, dried blood, meat or fish, sulphate of ammonia or nitrate of soda, sulphate of potash or muriate of potash and sulphuric acid.	'Fresh Ground Bone'— Guaranteed..... Found.....
1328	" "	" "		'Bowker's Farm and Garden Fertilizer'— Guaranteed..... Found.....
1329	" "	" "		'Bowker's Square Brand Bone and Potash Fertilizers'— Guaranteed..... Found.....
1330	" "	" "		'Bowker's Potato and Vegetable Fertilizer'— Guaranteed..... Found.....
1331	" "	" "		'Bowker's Vermont Fertilizer'— Guaranteed..... Found.....
1332	Victoria Chemical Co., Ltd., Victoria, B.C.	Victoria Chemical Co., Ltd., Victoria, B.C.	Nitrate of soda, muriate of potash and superphosphate of lime	Fertilizer 'A'— Guaranteed..... Found.....
1333	" "	" "		Fertilizer 'B'— Guaranteed..... Found.....
1334	" "	" "	Muriate of potash and superphosphate of lime.	Fertilizer 'C'— Guaranteed..... Found.....
1335	" "	" "	Treating spent bone- char with sulphuric acid.	'Superphosphate of Lime'— Guaranteed..... Found.....

## Samples of Commercial Fertilizers, registered for 1902.

RESULTS OF ANALYSIS.										Number of Sample.
Nitrogen.		Phosphoric Acid.					Potash.	Moisture.	Relative Value per Ton of 2,000 lbs.	
Total including that of Nitric Acid or Ammonia, if present.	Total Calculated as Ammonia.	Soluble Water.	Citric Soluble.	In-soluble.	Total.	Total Available.				
p. c.	p. c.	p. c.	p. c.	p. c.	c.	p. c.	p. c.	p. c.	8 cts.	
2.06 2.53	2.50 3.08	6.00 6.71	2.00 2.08	1.00 1.28	9.00 10.07	8.00 8.79	1.50 2.22	..... 9.50	16.22 18.91	1320
2.47 2.82	3.00 3.47	6.00 7.16	2.00 2.12	1.00 1.48	9.00 10.71	8.00 9.28	6.00 6.37	..... 9.86	21.92 24.81	1321
1.65 2.06	2.00 2.49	6.00 7.03	2.00 3.20	1.00 0.64	9.00 10.87	8.00 10.23	2.00 2.06	..... 10.20	15.76 19.25	1322
3.29 3.60	4.00 4.28	6.00 9.28	2.00 0.00	1.00 1.08	9.00 10.36	8.00 9.28	7.00 7.14	..... 10.30	24.95 27.60	1323
0.82 1.29	1.00 1.36	6.00 7.16	2.00 1.92	1.00 1.28	9.00 10.36	8.00 9.08	2.00 1.73	..... 9.50	13.77 16.06	1324
2.06 2.38	2.50 3.09	6.00 8.31	2.00 0.52	1.00 1.40	9.00 10.23	8.00 8.83	1.50 2.16	..... 10.40	16.22 18.92	1325
2.41	2.92	2.23	6.60	3.32	12.15	8.83	2.62	18.06	19.47	1326
2.06	3.00 3.37	.....	22.50	3.32	24.00 25.82	22.50	.....	6.90	35.17	1327
1.53	2.00 1.85	5.25	2.31	3.64	10.00 11.20	8.00 7.56	2.00 2.60	..... 7.95	16.33	1328
2.10	2.00 2.55	2.56	3.58	5.76	12.00 11.90	6.00 6.14	2.00 1.80	..... 9.95	15.67	1329
1.90	2.00 2.31	5.25	1.41	4.60	11.00 11.28	9.00 6.66	2.00 2.12	..... 9.60	16.02	1330
2.70	3.00 3.28	6.40	0.96	3.33	10.00 10.68	.....	4.00 3.49	..... 5.50	19.88	1331
4.00 3.99	4.84	11.20	.....	0.45	10.00 11.65	11.20	7.00 6.87	..... 9.20	32.41	1332
3.50 3.85	4.68	9.40	0.80	Trace.	9.00 10.29	10.29	11.00 11.90	..... 9.10	35.79	1333
0.77	0.93	12.47	0.96	Trace.	12.50 13.43	13.43	11.00 11.16	..... 11.80	29.97	1334
0.89	1.08	14.20	0.60	0.45	16.00 15.25	14.80	.....	10.55	20.43	1335

TABLE I.—Statement of the Results of Examining 106 Standard

Number of Sample.	Name of Manufacturer.	By whom sent.	From what materials Produced.	Name or Brand of Fertilizer.
1336	Imported from Chili.	Victoria Chemical Co., Ltd., Victoria, B.C.		'Nitrate of Soda'— Guaranteed ..... Found .....
1337	Imported from Germany.	" "		'Kainite'— Guaranteed ..... Found .....
1338	" "	" "		'Sulphate of Potash'— Guaranteed ..... Found .....
1339	" "	" "		'Muriate of Potash'— Guaranteed ..... Found .....
1340	" "	" "		'Thomas Phosphate Powder'— Guaranteed ..... Found .....
1341	F. D. Burris, Truro, N.S.	Manufacturer.....	Muriate of potash, nitrate of soda and dissolved bone, with black mud and plaster for a base.	'Potato Phosphate'— Guaranteed ..... Found .....
1342	" "	" "		'Bone Meal' (coarse ground)— Guaranteed ..... Found .....
1343	Nova Scotia Fertilizer Co., Halifax, N.S.	Manufacturers.....	Bone char, bone, dried blood, tankage, bone phosphates, sulphate of ammonia, nitrate of soda, high grade muriate of potash or sulphate of potash and sulphuric acid.	'Cere's Superphosphate'— Guaranteed ..... Found .....
1344	" "	" "		'Apple Tree Phosphate'— Guaranteed ..... Found .....
1345	" "	" "		'Strawberry Phosphate'— Guaranteed ..... Found .....
1346	" "	" "		'Potato Phosphate'— Guaranteed ..... Found .....
1347	" "	" "		'Pure Ground Bone'— Guaranteed ..... Found .....
1348	B. & M. Rattenbury, Charlottetown, P.E.I.	" "		'Blood, Bone and Tankage'— Guaranteed ..... Found .....
1349	" "	" "		'Ground Bone'— Guaranteed ..... Found .....
1350	The American Agricultural Chemical Co.	Buffalo Sales Dept., Buffalo, N.Y.		'Crocker's New York Special Fertilizer'— Guaranteed ..... Found .....
1351	" "	" "		'Crocker's Dissolved Bone and Potash'— Guaranteed ..... Found .....
1352	The Standard Fertilizer and Chemical Co., Smith's Falls, Ont.	Manufacturers.....	Mineral superphosphate of lime, sulphate of ammonia, potash salts and nitrate of soda.	'Star Brand'— Guaranteed ..... Found .....



Samples of Commercial Fertilizers, registered for 1902--*Continued.*

RESULTS OF ANALYSIS.										Number of Sample.
Nitrogen.		Phosphoric Acid.					Potash.	Moisture.	Relative value per ton of 2,000 lbs.	
Total including that of Nitric Acid or Ammonia, if present.	Total calculated as Ammonia.	Soluble in Water.	Citric Soluble.	In-soluble.	Total.	Total Available.				
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	\$ cts.	
16.00 15.62	18.97									1336
								1.25	49.32	1337
							12.00 14.40	14.40	15.12	1338
							50.00 44.96	1.00	53.00 47.21	1339
							50.00 44.40	4.80	53.00 46.62	1340
			12.03	5.56	16.00 17.59	12.03		0.35	17.12	1341
1.71	2.07	1.92	3.51	Trace.	5.43	5.43	5.81	11.95	16.56	1342
4.38	5.32		1.36	7.99	19.35	11.36		5.80	31.00	1343
1.89	2.00 2.30	5.11	2.92	3.00	9.20 11.03	8.03	2.14 2.97	9.85	17.90	1344
2.67	3.25 3.25	2.88	2.87	3.52	7.80 9.27	5.75	6.53 6.06	7.80	20.45	1345
1.75	2.02 2.12	4.16	1.27	3.53	8.30 8.96	5.43	6.50 6.12	4.22	18.6	1346
2.60	3.71 3.16	4.79	1.30	3.51	7.80 9.60	6.09	4.70 4.63	8.95	19.33	1347
3.33	4.53 4.04		11.18	11.98	22.66 23.16	11.18		8.95	32.25	1348
5.56	6.75		11.35	4.16	15.51	11.35	0.92	9.65	30.64	1349
1.61	2.06		19.20	6.39	25.59	19.20	1.62	16.75	33.07	1350
		8.00 10.87	2.00 0.93	1.06 1.44	11.00 13.24	10.00 11.80	8.00 8.32	6.45	20.50 23.33	1351
		8.00 10.23	2.00 1.93	1.00 1.72	11.00 13.88	10.00 12.44	2.00 3.45	12.95	14.20 18.54	1352
1.94	2.00 2.36	7.03	1.66	0.90	9.59	5.00 8.69	2.00 2.86	6.10	18.20	

TABLE I.—Statement of the Results of Examining 106 Standard

Number of Sample.	Name of Manufacturer.	By whom sent.	From what Materials Produced.	Name or Brand of Fertilizer.
1353	The Leeds Phosphate Works, Leeds, Eng.	G. W. Campbell Arnott, Agent General in Canada, Toronto.		'Thomas' Phosphate Flour'— Guarantee Found ..
1356	Provincial Chemical Fertilizer Co., St. John, N.B.			'Imperial Superphosphate'— Found ..
1357	" " "			'Victor Guano'— Found ..

## Samples of Commercial Fertilizers, registered for 1902—Continued.

RESULTS OF ANALYSIS.										Relative value per ton of 2,000 lbs.	Number of Sample.
Nitrogen.		Phosphoric Acid.					Potash.	Moisture.			
Total including that of Nitric Acid or Ammonia, if present.	Total calculated as Ammonia.	Soluble in Water.	Citric Soluble.	In-soluble.	Total.	Total available.					
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	\$ cts.		
.....	.....	.....	10.60	7.92	18.00 18.61	10.00	.....	0.11	17.30	1353	
2.82	3.43	10.04	1.95	5.76	17.75	11.99	2.20	10.80	25.00	1356	
1.86	2.26	7.08	2.01	8.76	18.45	9.60	3.07	11.25	31.74	1357	

TABLE II. — Result of the Examination of 85

Date of Collection.	No. of Sample.	NAME AND ADDRESS OF		Name or Brand of Fertilizer.	Nitrogen.	
		Vendor.	Manufacturer or Furnisher as given by Vendor.		Total including Per Cent of Nitric Acid or Ammonia if present.	Total calculated as Ammonia.
1902.		Halifax, N.S.	Analyst, M. Bowman, Halifax, N.S.		p. c.	p. c.
April 11	20215	A. L. Melvin....	Provincial Chemical Co., St. John, N.B.	'Potato Phosphate'— Guaranteed..... Standard sample..... Sample as sold.....	2.80 2.50 1.76	3.40 3.03 2.14
" 11	20216	" .....	" .....	'Imperial Superphosphate'— Guaranteed..... Standard sample..... Sample as sold.....	2.31 2.39 2.27	2.80 2.90 2.75
" 12	20217	F. T. De Wolfe...	Bowker Fertilizer Co., Boston, Mass.	'Ground Bone'— Guaranteed..... Standard sample..... Sample as sold.....	..... 2.96 2.40	3.00 3.37 2.99
" 12	20218	" .....	" .....	'Bone and Potash'— Guaranteed..... Standard sample..... Sample as sold.....	..... 2.10 1.76	2.00 2.55 2.14
		Dartmouth, N.S.				
" 13	20219	E. M. Walker ....	American Agricultural Chemical Co., Boston, Mass.	'Pacific Guano'— Guaranteed..... Standard sample..... Sample as sold.....	1.63 1.37 1.64	1.25 1.66 2.04
" 14	20220	" .....	" .....	'Potato Special'— Guaranteed..... Standard sample..... Sample as sold.....	2.06 2.04 1.88	2.50 2.48 2.28
" 14	20221	Colin McNab....	Alberts Thomas Phosphate Co., London, Eng.	'Thomas' Phosphate Powder'— Guaranteed..... Standard sample..... Sample as sold.....	..... ..... .....	..... ..... .....
		Kentville, N.S.				
" 15	20222	W. M. Carruthers.	Russia Cement Co., Gloucester, Mass.	'Complete Manure for Corn, Grain and Grass'— Guaranteed..... Standard sample..... Sample as sold.....	..... ..... 2.72	..... ..... 3.30
" 15	20223	" .....	" .....	'Complete Manure for Potatoes, Roots and Vegetables'— Guaranteed..... Standard sample..... Sample as sold.....	..... ..... 3.14	..... ..... 3.81
" 15	20224	C. O. Allen. ....	Nova Scotia Fertilizer Co., Halifax, N.S.	'Potato Phosphate'— Guaranteed..... Standard sample..... Sample as sold.....	..... 2.60 1.23	3.71 3.16 1.50

## Samples of Fertilizers as sold in 1902.

RESULTS OF ANALYSIS.								No. of Sample.	District Analyst's Remarks.
Phosphoric Acid.					Potash.	Moisture.	Relative value per ton of 2,000 lbs		
Soluble in Water.	Citric Soluble.	In-soluble.	Total.	Total Available.					
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	\$ cts.		
6.48	1.92	7.22	15.62	8.40	7.55			20215	
6.71	2.89	5.43	15.03	9.60	7.72	7.20	26.96		
6.79	2.62	2.03	11.44	9.41	8.91	20.57	19.97		Below guarantee except in available phosphoric acid.
7.19	2.70	7.88	17.77	9.80	2.02			20216	
7.67	2.25	7.03	10.95	9.92	2.64	9.55	22.30		
6.51	1.98	2.65	11.14	8.46	3.04	18.95	19.43		Genuine.
			24.00					20217	
	22.50	3.32	25.82	22.50		3.90	35.17		
0.40	11.75	13.08	25.23	12.15		5.02	32.39		Deficient in available phosphoric acid and therefore adulterated.
			12	6.00	2.00			20218	
2.56	3.58	5.76	11.90	6.14	1.80	9.95	15.67		
2.57	5.13	4.06	11.76	7.70	2.05	12.65	16.31		Genuine.
6.00	2.00	2.60	10.00	8.00	2.00		14.67	20219	
7.36	1.53	2.56	11.45	8.89	2.49	14.90	17.18		
6.01	2.88	1.33	10.22	8.89	1.49	12.07	16.38		"
5.00	3.00	2.00	10.00	8.00	3.00		17.99	20220	
5.25	3.20	2.24	10.69	8.45	4.17	14.05	19.77		
5.37	3.98	2.11	11.16	9.05	2.89	18.74	18.67		"
			17.00					20221	
	13.53	4.13	17.66	13.53		0.17	17.77		
	12.38	4.49	16.87	12.38		0.40	16.76		"
Not registered, therefore sold illegally.								20222	
3.78	4.69	3.05	10.52	8.47	9.57	10.17	26.90		Not registered.
Not registered, therefore sold illegally.								20223	
3.66	4.06	3.89	11.61	7.72	8.92	6.91	26.94		Not registered.
4.79	1.30	3.51	7.60	6.09	4.70			20224	
2.87	3.44	2.25	8.56	6.31	3.65	8.95	19.33		
						14.77	14.68		Below guarantee in nitrogen and potash, and therefore adulterated.

TABLE II.—Results of the Examination of 85

Date of Collection.	No. of Sample.	NAME AND ADDRESS OF		Name or Brand of Fertilizer.	Nitrogen.	
		Vendor.	Manufacturer or Furnisher as given by Vendor.		Total including that of Nitric Acid or Ammonia if present.	Total calculated as Ammonia.
					p. c.	p. c.
1902.		Quebec.	Analyst, Dr. M. Fiast, Quebec.			
April 3	23307	P. T. Legare . . .	The Nichols Chemical Co., Capetown, Que.	'Reliance'— Guaranteed . . . . . Standard sample . . . . . Sample as sold . . . . .	 2.48 2.27	 2.00 3.01 2.76
" 3	23308	" . . . . .	" . . . . .	'Superphosphate No. 1'— Guaranteed . . . . . Standard sample . . . . . Sample as sold . . . . .	 0.19	 0.23
" 3	23309	" . . . . .	" . . . . .	'Royal Canadian'— Guaranteed . . . . . Standard sample . . . . . Sample as sold . . . . .	 4.01 2.88	 4.00 4.87 3.50
" 3	23310	" . . . . .	" . . . . .	'The Victor'— Guaranteed . . . . . Standard sample . . . . . Sample as sold . . . . .	 2.58 2.47	 2.00 3.13 3.00
" 3	23311	J. B. Renaud & Co. Ottawa.	Provincial Chemical Fertilizer Co., St. John, N.B.	'Victor Guano'— Guaranteed . . . . . Standard sample . . . . . Sample as sold . . . . .	 1.77 2.56 1.65	 2.15 2.11 2.00
" 21	22623	Graham Bros. . . . . Brockville, Ont.	Standard Fertilizer Co., Smith's Falls, Ont.	'Bone Meal'— Guaranteed . . . . . Standard sample . . . . . Sample as sold . . . . .	 4.22 3.76	 4.00 5.13 4.56
" 22	22624	Brown & Sons . . .	American Agricultural Chemical Co., Boston, Mass.	'Potato Fertilizer'— Guaranteed . . . . . Standard sample . . . . . Sample as sold . . . . .	 2.06 1.95 2.31	 2.50 2.36 2.80
" 22	22625	" . . . . .	" . . . . .	'B. D. Sea Fowl Guano'— Guaranteed . . . . . Standard sample . . . . . Sample as sold . . . . .	 2.06 2.38 2.03	 2.50 3.09 2.46
" 22	22626	" . . . . .	" . . . . .	'Complete Manure for Potatoes and Vegetables'— Guaranteed . . . . . Standard sample . . . . . Sample as sold . . . . .	 3.29 3.60 2.67	 4.00 4.36 3.25
" 22	22627	" . . . . .	" . . . . .	'New Method Fertilizer'— Guaranteed . . . . . Standard sample . . . . . Sample as sold . . . . .	 1.03 1.34 1.06	 1.25 1.63 1.28

## Samples of Fertilizers as sold in 1902—Continued.

RESULTS OF ANALYSIS.							Relative value per ton of 2,000 lbs	No. of Sample	District Analyst's Remarks.
Phosphoric Acid.									
Soluble in Water.	Citric Soluble.	In-soluble.	Total.	Total Available.	Potash.	Mol- ure.			
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	¢ cts.		
5.97 6.11	1.74 2.88	3.86 4.32	11.67 12.31	6.00 7.71 7.90	2.00 5.44 2.46	13.78 14.17	19.84 19.79	23307	Genuine to guaran-
11.83 9.27	1.19 1.92	3.20 4.80	16.23 15.99	11.50 13.02 11.19	0.46 Traces.	10.86 12.85	16.96 15.22	23308	"
9.30 9.43	0.60 2.62	3.20 3.20	13.10 15.25	9.00 9.90 12.05	5.00 6.64 2.06	6.92 12.00	29.37 26.35	23309	Genuine but below guaran- tee in ammonia and potash.
8.55 6.56	1.30 3.36	3.90 3.36	13.75 13.27	7.00 9.85 9.92	3.00 4.58 3.72	11.36 14.55	24.86 23.68	23310	Genuine and up to guaran- tee.
6.84 4.80	3.36 2.82 4.79	8.17 6.56 8.81	17.32 16.25 17.90	9.15 9.66 9.59	1.55 3.42 1.58	9.85 13.50	23.02 19.96	23311	"
	16.32 12.95	5.43 10.23	21.75 23.18	16.32 12.95		6.50 6.93	33.51 33.50	23623	"
5.00 5.76 6.65	3.00 3.35 3.47	2.00 1.92 2.19	10.00 11.03 12.31	8.00 11.00 10.12	3.00 3.46 4.03	13.85 9.88	17.99 19.48 23.43	23624	"
6.00 8.31 6.50	2.00 0.52 2.94	1.00 1.46 2.39	9.00 10.23 11.83	8.00 8.83 9.44	1.50 2.16 1.85	16.22 10.40 7.00	18.22 18.92 18.54	23625	"
6.00 9.28 8.00	2.00 0.00 2.55	1.00 1.06 1.92	9.00 10.36 12.47	8.00 9.28 10.55	7.00 7.14 6.10	10.30 9.93	24.95 27.60 19.40	23626	Genuine but below guaran- tee in ammonia and potash.
6.00 6.07 7.45	2.00 2.28 2.15	2.00 3.00 2.07	11.00 11.35 11.67	8.00 8.35 9.60	2.00 2.54 2.95	14.67 15.45 7.68	17.58 17.55	23627	Genuine but below guaran-



TABLE II.—Results of the Examination of 85

Date of Collection.	No. of Sample.	NAME AND ADDRESS OF			Nitrogen.	
		Vendor.	Manufacturer or Furnisher as given by Vendor.	Name or Brand of Fertilizer.	Total, including that of Nitric Acid or Ammonia if present.	Total, calculated as Ammonia.
					p. c.	p. c.
1902.		Richmond, P.Q.	Analyst, A. L. Tourchot, St. Hyacinthe, P.Q.			
April 2	23301	D. Taylor	Standard Fertilizer and Chemical Co., Smith's Falls, Ont.	'Special'— Guaranteed Standard sample Sample as sold	  3.32 3.09	  3.50 4.04 3.75
" 2	23302	"	"	'Superphosphate of Lime'— Guaranteed Standard sample Sample as sold	  0.11	  0.13
" 2	23304	M. Steele & Co.	Nichols Chemical Co., Capelton, P.Q.	'Victor'— Guaranteed Standard sample Sample as sold	  2.58 1.90	  2.00 3.13 2.31
" 2	23305	"	"	'Capelton'— Guaranteed Standard sample Sample as sold	  0.29	  0.36
" 2	23306	D. Taylor	Standard Fertilizer and Chemical Co., Smith's Falls, Ont.	'Standard'— Guaranteed Standard sample Sample as sold	  2.67 2.27	  2.50 3.24 2.75
" 8	23312	E. Payne, Granby.	American Agricultural Fertilizer Co., Boston, Mass.	'Bradley's Eclipse Phosphate for all crops'— Guaranteed Standard sample Sample as sold	  1.03 1.37 1.40	  1.25 1.66 1.70
" 9	23313	C. W. Beals	Knolton, P.Q.	'Bradley's Eclipse Phosphate for all crops'— Guaranteed Standard sample Sample as sold	  1.03 1.37 1.37	  1.25 1.66 1.66
" 10	23314	F. W. Wallace, Mary St.	Mayoy, P.Q.	'Bowker's Corn Phosphate'— Guaranteed Standard sample Sample as sold	   1.44	   1.75
" 10	23315	"	"	'Bowker's Potato and Vegetable Phosphate'— Guaranteed Standard sample Sample as sold	  1.90 1.58	  2.00 2.31 1.92
" 10	22621	A. Millar	Spencerville, Ont.	'The Victor'— Guaranteed Standard sample Sample as sold	  2.58 2.58	  2.00 3.13 3.13
" 21	22622	Graham Bros.	Ottawa.	'W. A. Freeman Co., Hamilton, Ont.		
				'Tankage'— Guaranteed Standard sample Sample as sold	  5.44 6.30	  5.00 6.61 7.65

Samples of Fertilizers as sold in 1902—*Continued.*

RESULTS OF ANALYSIS.							Relative value per ton of 2,000 lbs	No. of Sample.	District Analyst's Remarks.
Phosphoric Acid.					Potash.	Moisture.			
Soluble in Water.	Citric soluble.	In-soluble.	Total.	Total Available.					
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	8 cts.		
8.12	0.90	1.28	10.00	8.00	6.00			23301	Up to guarantee.
7.93	1.73	1.00	10.75	9.66	7.39	9.20	26.85		
					5.64	10.01	25.09		
12.47	0.49	3.51	16.00	14.00				23302	"
12.16	2.49	2.24	16.89	12.96		10.30	16.83		
				14.65		13.65	18.00		
8.55	1.30	3.90	13.75	7.00	3.00			23304	"
6.91	3.52	2.94	13.37	9.85	4.58	11.35	24.86		
				10.43	3.09	12.98	20.85		
8.95	1.86	4.48	15.29	8.00				23306	"
7.90	1.64	5.05	14.59	10.81	1.00	14.60	15.90		
				9.54		13.58	12.80		
9.72	1.16	1.91	11.00	9.00	2.00			23306	"
8.70	1.98	1.79	12.47	12.79	10.58	8.95	22.84		
				10.68	2.63	11.66	21.37		
6.00	2.00	2.00	10.00	8.00	2.00		14.67	23312	"
5.76	2.81	2.87	11.44	8.57	2.32	10.15	16.59		
5.60	2.26	2.69	10.55	7.86	2.53	14.64	16.03		
6.00	2.00	2.00	10.00	8.00	2.00		14.67	23313	"
5.76	2.81	2.87	11.44	8.57	2.32	16.15	16.59		
5.60	2.33	2.18	10.11	7.93	2.55	15.16	15.89		
Not registered by this name.								23314	"
5.31	2.69	3.32	11.32	8.00	2.32	16.08	16.23		
5.25	1.41	4.60	11.60	9.00	2.00			23315	"
5.40	2.57	3.84	11.81	6.66	2.12	9.60	10.02		
				7.97	2.32	15.94	16.69		
8.55	1.30	3.90	13.75	7.00	3.00			22621	
7.89	1.71	3.52	12.12	9.85	4.58	11.35	24.86		
				9.60	4.60	10.18	23.63		
			12.00					22622	
	9.91	2.24	12.15	9.91	Trace.	4.35			
0.13	6.76	4.16	11.05	6.89		6.10	26.88		

TABLE II.—Results of the Examination of 85

Date of Collection.	No. of Sample.	NAME AND ADDRESS OF			Nitrogen.	
		Vendor.	Manufacturer or Furnisher as given by Vendor.	Name or Brand of Fertilizer.	Total including that of Nitric Acid or Ammonia if present.	Total calculated as Ammonia.
1902.		Montreal.	Analyst, J. T. Donald, Montreal.		p. c.	p. c.
Mch. 21	21212	Laing Packing & Provision Co.	Vendors .....	'Laing Fertilizer'— Guaranteed..... Standard sample..... Sample as sold.....	4.12 4.70 5.48	5.00 5.69 6.66
" 21	21213	Montreal Union Abattoir Co.	" .....	'Tankage'— Guaranteed..... Standard sample..... Sample as sold.....	7.86	9.55
" 22	21214	Brodie & Harvie, Bleury street.	Standard Fertilizer Co., Smith's Falls, Ont.	'Special'— Guaranteed..... Standard sample..... Sample as sold.....	3.32 3.02	3.50 4.04 3.67
" 24	21215	R. J. Latimer, 144 McGill street.	Nichols Chemical Co., Capelton, P.Q.	'Victor'— Guaranteed..... Standard sample..... Sample as sold.....	2.58 2.46	2.00 3.13 2.99
" 24	21216	" " ..	" " ..	'Capelton'— Guaranteed..... Standard sample..... Sample as sold.....	0.29 0.24	0.36 0.20
" 24	21217	" " ..	" " ..	'Royal Canadian'— Guaranteed..... Standard sample..... Sample as sold.....	4.01 2.32	4.00 4.87 2.81
" 24	21218	" " ..	" " ..	'No. 1'— Guaranteed..... Standard sample..... Sample as sold.....	0.36	0.43
		Hurdman's, P.Q.				
April 8	21219	Thos. Cogland....	Bowker Fertilizer Co., Boston, Mass.	'Vermont Phosphate'— Guaranteed..... Standard sample..... Sample as sold.....	2.70 2.53	3.00 3.28 3.07
" 8	21220	" .....	" " ..	'Potato and Vegetable'— Guaranteed..... Standard sample..... Sample as sold.....	1.90 1.59	2.00 2.31 1.93
" 8	21221	Wm. Anderson...	American Agricultural Fertilizer Co., Boston, Mass.	'Eclipse Phosphate'— Guaranteed..... Standard sample..... Sample as sold.....	1.03 1.37 1.36	1.25 1.66 1.65
		Smith's Falls, Ont.	Analyst, Dr. F. X. Valade, Ottawa.			
Mar. 13	22601	The Standard Fertilizer Co., Smith's Falls, Ont.	Vendors.....	'No. 1 Brand'— Guaranteed..... Standard Sample..... Sample as sold.....	1.76 2.17	2.00 2.14 2.64
" 13	22602	" .....	" .....	'Corn and Grass'— Guaranteed..... Standard sample..... Sample as sold.....	2.49 1.96	2.00 5.02 2.38
" 13	22603	" .....	" .....	'Special'— Guaranteed..... Standard sample..... Sample as sold.....	3.32 3.06	3.50 4.04 3.74

## Samples of Fertilizers as sold in 1902—Continued.

RESULTS OF ANALYSES.							Relative value per ton of 2,000 lbs.	No. of Sample.	District Analyst's Remarks.
Phosphoric Acid.					Potash.	Mois- ture.			
Soluble in Water.	Citric soluble.	In- soluble.	Total.	Total Avail- able.					
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	\$ cts.		
1.00	8.55	3.53	14.71	9.55		5.75	25.42	21212	Above guaranteed value.
	13.56	1.93	15.49	13.56	0.04	6.08	30.04		
Not registered for 1902, therefore sold illegally.									
Heavy traces.	1.98	0.33	2.31	1.98	0.30	16.81	21.68	21213	Genuine.
8.12	0.90	1.28	10.00	8.00	6.00			21214	Above guaranteed value.
8.37	0.49	1.30	10.16	8.86	7.39	9.20	26.85		
					6.57	9.02	25.12		
8.55	1.30	3.90	13.75	9.85	3.00	11.35	24.86	21215	Above guarantee in ammonia and under guarantee in available phosphoric acid and potash.
4.88	1.40	3.96	10.24	6.28	2.29	12.60	16.89		
8.95	1.86	4.48	15.29	8.00				21216	Below guarantee in available phosphoric acid.
4.94	1.43	5.19	11.56	10.81	1.00	14.60	15.90		
				6.37	0.18	12.77	9.83		
9.30	0.60	3.20	13.10	9.00	5.00			21217	Under guarantee in ammonia and available phosphoric acid.
7.17	0.79	3.52	11.48	9.90	6.64	6.92	29.37		
				7.96	4.75	11.64	20.11		
11.83	1.19	3.20	16.22	11.50				21218	Below guarantee in available phosphoric acid, and therefore adulterated.
7.37	1.17	5.04	13.58	13.02	0.46	10.85	16.96		
				8.54	0.16	13.85	12.67		
6.40	0.95	3.33	10.00	8.00	4.00			21219	Fully up to guarantee.
4.46	4.74	2.06	10.68	7.35	3.49	5.50	19.88		
			11.00	9.00	2.00			21220	Slightly under guarantee in available phosphoric acid and slightly over guarantee in potash.
5.25	1.41	4.60	11.26	6.66	2.12	9.60	16.02		
5.14	2.97	2.81	10.92	8.11	2.17	15.70	16.38		
6.00	2.00	2.00	10.00	8.00	2.00			21221	Fully up to guarantee.
5.76	2.81	2.87	11.44	8.57	2.32	16.15	16.59		
4.96	2.95	3.04	10.95	7.91	2.11	13.62	15.39		
7.67	1.68	3.99	11.00	9.00	1.00			22601	Genuine.
8.68	1.30	1.48	13.34	9.35	2.33	9.85	18.92		
			11.36	9.88	1.37	13.64	18.83		
7.80	0.83	1.92	9.00	7.00	4.00			22602	"
6.68	1.04	1.62	10.55	8.63	4.92	8.85	22.00		
			9.34	7.72	3.00	13.93	17.50		
8.12	0.90	1.28	10.00	8.00	6.00			22603	"
7.20	1.28	1.84	10.30	9.02	7.39	9.20	26.85		
			10.32	8.48	5.88	10.42	24.16		

TABLE II.—Results of the Examination of 85

Date of Collection.	No. of Sample.	NAME AND ADDRESS OF		Name or Brand of Fertilizer.	Nitrogen.	
		Vendor.	Manufacturer or Furnisher as given by Vendor.		Total including that of Nitric Acid or Ammonia if present.	Total calculated as Ammonia.
1902.		Smith's Falls, Ont.	Analyst, Dr. F. X. Valade, Ottawa.		p. c.	p. c.
Mar. 13	22604	The Standard Fertilizer Co., Smith's Falls, Ont.	Vendors	'Standard'— Guaranteed..... Standard sample..... Sample as sold.....	..... 2.67 2.88	2.50 3.24 2.89
" 13	22605	"	"	'Royal'— Guaranteed..... Standard sample..... Sample as sold.....	..... 1.64 1.68	2.00 1.98 2.04
" 13	22606	"	"	'Superphosphate'— Guaranteed..... Standard sample..... Sample as sold.....	..... 0.11 0.70	0.13 0.85
		Spencerville, Ont.				
" 27	22617	Mr. Smailie, Farmer.	The American Agricultural Chemical Co., Boston, Mass.	'"B. D." Sea Fowl Guano'— Guaranteed..... Standard sample..... Sample as sold.....	2.06 2.38 2.66	2.50 3.09 3.23
" 27	22618	"	"	'Bradley's Potato Fertilizer'— Guaranteed..... Standard sample..... Sample as sold.....	2.06 1.95 1.96	2.50 2.36 2.38
" 27	22619	"	"	'Bradley's Farmers' New Method'— Guaranteed..... Standard sample..... Sample as sold.....	1.03 1.34 2.38	1.25 1.53 2.89
		Belleville, Ont.	Analyst, Dr. W. H. Ellis, Toronto.			
Mar. 14	22607	The Belleville Canning Co.	The American Agricultural Chemical Co., Boston, Mass.	'Dissolved Bone and Potash'— Guaranteed..... Standard sample..... Sample as sold.....	..... ..... 1.99	..... ..... 2.42
		Toronto.				
" 15	22608	The Steele, Briggs Co., King's St.	Furnished by A. Boyd, Toronto.	'Nitrate of Soda'— Guaranteed..... Standard sample..... Sample as sold.....	..... ..... 16.25	..... ..... 19.73
" 15	22609	"	Harris & Co., Toronto.	'Bone Meal'— Guaranteed..... Standard sample..... Sample as sold.....	..... 5.02 4.95	4.76 6.10 6.01
" 15	22610	W. Rennie, seed merchant.	W. A. Freeman Company, Hamilton, Ont.	'Bone Meal'— Guaranteed..... Standard sample..... Sample as sold.....	..... 5.04 5.32	3.00 6.12 6.46
" 15	22611	"	"	'Thomas Phosphate'— Guaranteed..... Standard sample..... Sample as sold.....	..... ..... .....	..... ..... .....

## Samples of Fertilizers as sold in 1902—Continued.

RESULTS OF ANALYSES.								No. of Sample.	District Analyst's Remarks.
Phosphoric Acid.					Potash.	Moisture.	Relative value per ton of 2,000 lbs		
Soluble in Water.	Citric Soluble.	In-soluble.	Total.	Total Available.					
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	% cts.		
9.72	1.16	1.91	11.00	9.00	2.09			22604	
8.72	0.86	1.06	12.79	10.88	2.78	8.95	22.84		
			10.66	9.58	2.20	11.31	19.75		Genuine.
8.13	1.91	1.92	9.00	8.00	3.00			22605	
7.06	0.96	1.14	11.96	10.04	3.95	7.65	20.54		
			9.16	8.02	3.20	5.02	17.26		"
12.47	0.49	3.51	16.00	14.00				22606	
12.80	1.62	1.76	16.47	12.96		10.30	16.23		
			16.18	14.42	0.63	6.67	18.63		"
6.00	2.00	1.00	9.00	8.00	1.50		16.22	22617	
8.31	0.52	1.40	10.23	8.83	2.16	10.40	18.92		
4.12	0.80	4.30	9.22	4.92	2.63	15.59	16.25		Adulterated, being below guarantee in available phosphoric acid.
5.00	3.00	2.00	10.00	8.00	3.00		17.99	22618	
5.76	3.35	1.92	11.03	9.11	3.46	13.85	19.48		
4.96	2.16	3.72	10.84	7.12	4.04	12.73	18.39		Genuine, though a trifle low in available phosphoric acid.
6.00	2.00	2.00	10.00	8.00	2.00		14.67	22619	
6.07	2.28	3.00	11.35	8.35	2.54	15.45	16.58		
4.88	2.16	3.84	10.88	7.04	4.66	15.85	17.99		Genuine, though below guarantee in available phosphoric acid.
8.00	2.00	1.00	11.00	10.00	2.00			22607	
4.46	6.11	1.60	12.67	11.07	2.32	6.84	20.32		
Not registered.								22608	
						0.26	42.25		Not registered.
0.00	12.28	4.15	20.14	16.38	12.23	7.16		22609	
3.75	9.55	5.00	18.30	13.30	0.36	0.65	30.05		
						2.79	31.89		Up to standard.
	11.52	7.80	23.00	11.52	0.11	7.70	32.69	22610	
1.12	13.71	1.37	19.32	14.83		3.74	30.56		Up to standard but below guarantee in phosphoric acid.
0.00	13.53	4.13	17.00	13.53		0.17	17.77	22611	
1.79	12.56	1.95	16.30	14.35		0.46	17.34		Up to standard.

TABLE II.—Result of the Examination of 85

Date of Collection.	No. of Sample.	NAME AND ADDRESS OF		Name of Brand of Fertilizer.	Nitrogen.	
		Vendor.	Manufacturer or Furnisher as given by Vendor.		Total including that of Nitric Acid or Ammonia if present.	Total calculated as Ammonia.
1902.		<i>Toronto.</i>	<i>Analyst, Dr. W. H. Ellis, Toronto.</i>			
Mar. 15	22612	W. Rennie, seed merchant.	Wm. Faint, Peterboro', Ont.	'Bone Meal'— Guaranteed..... Standard sample..... Sample as sold.....	5.06 3.95	6.15 4.80
" 15	22613	J. A. Simmers, seed merchant, King St.	W. A. Freeman Company, Hamilton, Ont.	'Celery and Early Vegetables'— Guaranteed..... Standard sample..... Sample as sold.....	5.29 3.24	6.00 6.33 3.94
" 15	22614	"	"	'Potato Manure'— Guaranteed..... Standard sample..... Sample as sold.....	2.76 2.83	3.00 3.35 3.40
" 15	22615	"	"	'Lawn Fertilizer'— Guaranteed..... Standard sample..... Sample as sold.....	0.92	1.10
" 15	22616	"	"	'Sure Growth'— Guaranteed..... Standard sample..... Sample as sold.....	4.00 4.27	3.50 4.86 5.22
" 18	22023	W. A. Freeman Co.	<i>Analyst, F. T. Harrison, London, Ont.</i> Vendors .....	'Sure Growth'— Guaranteed..... Standard sample..... Sample as sold.....	4.00 4.22	3.50 4.86 5.12
" 18	22024	"	"	'Bone Meal'— Guaranteed..... Standard sample..... Sample as sold.....	5.04 4.64	6.12 5.64
" 18	22025	Thos. S. Morris, 45 Wellington St St. Catharines.		'Thomas' Phosphate'— Guaranteed..... Standard sample..... Sample as sold.....		
" 19	22027	Tetterington & Co. Ingersoll, Ont.	The American Agricultural Chemical Co., Boston, Mass.	'Guano'— Guaranteed..... Standard sample..... Sample as sold.....	2.06 3.25 2.53	2.50 3.94 3.07
" 20	22028	Robertson & McKay.	"	'Potato Fertilizer'— Guaranteed..... Standard sample..... Sample as sold.....	2.06 1.95 2.67	2.50 2.35 3.24
" 20	22029	"	"	'New Method'— Guaranteed..... Standard sample..... Sample as sold.....	1.03 1.34 1.62	1.25 1.63 1.96



## Samples of Fertilizers as sold in 1902—Continued.

RESULTS OF ANALYSES.								No. of Sample.	District Analyst's Remarks.
Phosphoric Acid.					Potash.	Moisture.	Relative value per ton of 2,000 lbs		
Soluble in Water.	Citric Soluble.	In-soluble.	Total.	Total Available.					
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	\$ cts.		
No guarantee given.								22612	
2.43	9.92 11.12	10.88 9.50	20.80 23.06	9.92 13.55		6.65 4.78	33.83 34.13	...	Not guaranteed.
4.48 3.35	1.47 5.58	3.33 2.97	9.00 9.28 11.90	5.95 8.93	6.00 7.15 6.55	8.40 7.26	28.21 25.71	22613	
4.05 2.87	3.04 15.48	3.67 3.45	8.00 11.66 21.80	7.99 18.35	5.00 4.54 2.49	10.40 9.43	21.77 30.92	22614	Up to guarantee in phosphoric acid and potash, below guarantee in ammonia.
Not registered.								22615	Up to standard and guarantee.
8.77	2.95	0.98	12.70	11.72	3.35	7.34	19.80	...	Not registered.
5.44 5.05	2.38 5.40	3.84 4.05	8.00 11.06 14.56	7.82 10.45	3.00 5.79 2.16	9.20 5.47	25.98 25.74	22616	
5.44 5.52	2.38 0.68	3.84 4.80	8.00 11.66 11.00	7.82 6.20	3.00 5.79 2.60	9.20 13.17	25.98 19.27	22023	Up to standard and guarantee.
	11.52 8.26	7.80 12.02	23.00 19.32 20.28	11.52 8.26	0.11	7.70 6.47	32.69 32.25	22024	Unadulterated.
	13.53 13.49	4.13 4.10	17.00 17.66 17.59	13.53 13.49		0.17 0.20	17.77 17.70	22025	Adulterated in that it is deficient in phosphoric acid.
5.00 6.39 6.23	3.09 2.18 2.15	2.00 4.28 4.54	10.00 12.83 13.93	8.00 8.57 8.38	1.50 1.72 2.56	16.41 13.25 8.05	20.96 19.97	22027	Unadulterated,
5.00 5.76 8.31	3.00 3.35 0.58	2.00 1.92 1.98	10.00 11.03 10.87	8.00 9.11 8.89	3.00 8.46 2.62	17.99 18.85 12.90	19.48 20.56	22028	"
6.00 6.07 4.80	2.00 2.28 4.09	2.00 3.00 1.21	11.00 11.35 10.10	8.00 8.35 8.89	2.00 2.54 2.23	14.67 15.45 10.56	16.68 16.92	22029	"

TABLE II.—Results of the Examination of 85

Date of Collection.	No. of Sample.	NAME AND ADDRESS OF		Name or Brand of Fertilizer.	Nitrogen.	
		Vendor.	Manufacturer or Furnisher as given by Vendor.		Total including that of Nitric Acid or Ammonia if present.	Total calculated as Ammonia.
1902.		<i>Ingersoll, Ont.</i>	<i>Analyst, F. T. Harrison, London, Ont.</i>		p. c.	p. c.
Mar. 20	22030	Ingersoll Packing Co.	Vendors.....	'Ingersoll Fertilizer'— Guaranteed..... Standard sample..... Sample as sold.....	6.41 7.81	9.60 7.80 9.48
"	22	<i>London, Ont.</i>				
"	22031	J. H. McMeechen.	".....	'Tankage'— Guaranteed..... Standard sample..... Sample as sold.....	10.28	12.39
"	22032	Darch & Hunter, Seed Merchants.	Michigan Carbon Works.	'Bone Dust'— Guaranteed..... Standard sample..... Sample as sold.....	1.62	1.96
		<i>St. John, N.B.</i>	<i>Analyst, E. B. Kenrick, Winnipeg.</i>			
"	18	17836 The Provincial Chemical Fertilizer Co.	Vendors.....	'Bone Meal'— Guaranteed..... Standard sample..... Sample as sold.....	4.68 2.97 4.18	5.68 3.60 5.07
"	19	17837 C. H. Peters & Sons, Walker's Wharf.	Bradley Fertilizer Co., Boston.	'Potato Fertilizer'— Guaranteed..... Standard sample..... Sample as sold.....	2.06 1.95 2.35	2.50 2.36 2.85
		<i>Sussex, N.B.</i>				
"	20	17838 W. B. McKay & Co.	Bowker Fertilizer Co., Boston.	'Potato and Vegetable'— Guaranteed..... Standard sample..... Sample as sold.....	1.90 1.90	2.00 2.31 2.31
"	20	17839 J. A. Humphreys.	Nova Scotia Fertilizer Co., Halifax, N.S.	'Ceres Superphosphate'— Guaranteed..... Standard sample..... Sample as sold.....	1.89 1.37	2.00 2.30 1.66
		<i>St. Andrew's, N.B.</i>				
"	25	17840 G. D. Grimmer...	Lowell Fertilizer Co., Lowell, Mass., U.S.A.	'Swift's Lowell Bone Fertilizer'— Guaranteed..... Standard sample..... Sample as sold.....	1.04	1.26
		<i>St. Stephen, N.B.</i>				
"	26	17841 F. E. Rose....	E. Frank Coe Co., Front St., New York.	'Ammoniated Eon.'— Guaranteed..... Standard sample..... Sample as sold.....	1.43	1.74
		<i>Woodstock, N.B.</i>				
"	27	17842 Batmain Bros....	New England Fertilizer Co., Boston, Mass.	'Seeding Down Fertilizer'— Guaranteed..... Standard sample..... Sample as sold.....	1.23	1.49
		<i>Fredericton, N.B.</i>				
"	29	17843 J. F. Van Buskirk	American Agricultural Fertilizer Co. Boston, Mass.	'Quinnipiac Climax Phosphate'— Guaranteed..... Standard sample..... Sample as sold.....	1.03 1.09 1.23	1.25 1.32 1.49

## Samples of Fertilizers as sold in 1902—Continued.

RESULTS OF ANALYSIS.								No. of Sample.	District Analyst's Remarks.	
Phosphoric Acid.					Potash.	Moisture.	Relative value per ton of 2,000 lbs			
Soluble in Water.	Citric Soluble.	In-soluble.	Total.	Total Available.						
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.			
Trace...	10.68	4.00	11.20	10.40	0.64	8.10	31.68	22030	Unadulterated.	
	9.00	2.68	14.68	10.68	0.52	9.23	31.68			
			11.77	9.00	0.24	11.24	31.67			
Not registered, therefore sold illegally.								22031	Not registered.	
	2.18	0.89	3.07	2.18	0.36	6.90	28.44			
Not registered, therefore sold illegally.								22032		
	16.57	13.37	29.94	16.57		3.50	35.49		"	
			24.28					17836	Genuine.	
	13.57	6.07	19.64	13.57		5.5	28.13			
			21.82			7.19				
5.00	3.00	2.00	10.00	8.00	3.00		17.99	17837	"	
5.76	3.35	1.92	11.03	9.11	3.46	13.85	19.48			
4.46	3.92	2.53	10.91	8.38	2.99	14.03	19.20			
			11.00	9.00	2.00			17838	"	
5.25	1.41	4.60	11.26	6.66	2.12	9.60	16.02			
4.48	4.00	2.24	10.72	8.48	2.68	15.83	17.82			
			9.20		2.14			17839	"	
5.11	2.92	3.60	11.03	8.03	2.97	9.85	17.90			
1.91	3.38	4.03	9.33	5.29	2.34	7.42	12.97			
Not registered, therefore sold illegally.								17840	Not registered.	
	3.88	3.38	2.06	9.32	7.26	2.96	11.37	14.61		
Not registered, therefore sold illegally.								17841		
	4.17	2.96	1.30	8.45	7.15	2.07	7.82	14.27	"	
Not registered, therefore sold illegally.								17842	"	
	4.90	3.10	2.68	10.68	8.00	2.07	14.85	14.96		
6.00	2.00	2.00	10.00	8.00	2.00		14.67	17843	Genuine.	
5.11	3.85	2.23	11.19	8.96	2.53	13.90	16.32			
5.59	1.65	4.41	7.35	7.24	1.95	9.16	14.85			

TABLE II.—Results of the Examination of 85

Date of Collection.	No. of Sample.	NAME AND ADDRESS OF			Nitrogen.	
		Vendor.	Manufacturer or Furnisher as given by Vendor.	Name or Brand of Fertilizer.	Total including that of Nitric Acid or Ammonia if present.	Total calculated as Ammonia.
1908.		Victoria, B.C.	Analyst, Dr. J. C. Ferguson, Victoria, B.C.		p. c.	p. c.
April 1	21668	Victoria Chemical Co.	Vendors.....	Mixed Fertilizer 'A'— Guaranteed ..... Standard sample ..... Sample as sold .....	4.00 3.99 3.82	4.84 4.66
" 1	21669	" "	" .....	Mixed Fertilizer 'B'— Guaranteed ..... Standard sample ..... Sample as sold .....	3.50 3.85 2.90	4.68 3.50
" 1	21670	" "	" .....	Mixed Fertilizer 'C'— Guaranteed ..... Standard sample ..... Sample as sold .....	0.77 0.56	0.33 0.68
" 1	21671	" "	" .....	'Superphosphate'— Guaranteed ..... Standard sample ..... Sample as sold .....	0.89 0.75	1.06 0.91
" 1	21672	W. A. Jackson & Co., Druggists. Vancouver, B.C.	" .....	'Liquid Fertilizers for Plants'— Guaranteed ..... Standard sample ..... Sample as sold .....	2.47	2.99
" 3	21673	M. J. Henry .....	Pacific Meat Co., Tacoma, U.S.A.	'Bone Meal'— Guaranteed ..... Standard sample ..... Sample as sold .....	4.20	5.10
" 3	21674	" .....	Hy. Cowell, Tacoma, U.S.A., imported from Germany.	'Muriate of Potash'— Guaranteed ..... Standard sample ..... Sample as sold .....		
" 3	21675	" .....	Victoria Chemical Co., imported from Chili.	'Nitrate of Soda'— Guaranteed ..... Standard sample ..... Sample as sold .....	16.00 15.62 15.40	18.97 18.60

Samples of Fertilizers, as sold in 1902—*Concluded.*

RESULTS OF ANALYSES.								No. of Sample.	District Analyst's Remarks.
Phosphoric Acid.					Potash.	Moisture.	Relative value per ton of 2,000 lbs		
Soluble in Water.	Citric Soluble.	In-soluble.	Total.	Total Available.					
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	% etc.		
11.20 9.80			10.00 11.65 11.69		7.00 6.87 7.20			21668	Genuine.
	0.84	0.45 1.05		11.20 10.84		9.20 14.15	32.41 29.73		
9.40 8.90	0.80 0.70	Trace, 0.49	9.00 10.29 10.09	10.29 9.60	11.00 11.90 10.90	9.10 12.19	35.79 30.01	21660	"
12.47 11.90	0.96 0.84	Trace, 0.56	12.50 13.43 13.30	13.43 12.74	11.00 11.16 11.00	11.80 15.21	29.77 28.77	21670	"
14.20 17.24	0.60 0.70	0.45 0.56	16.00 15.25 18.50	14.80 17.94		10.55 12.14	20.43 23.43	21671	"
Not registered.								21672	Not guaranteed.
3.65			3.65	3.65	19.88	1.14	31.18		
Not registered, therefore sold illegally.								21673	"
	16.60	7.40	24.00	16.60		7.40	35.74		
Not registered, therefore sold illegally.								21674	"
					56.85	3.13	50.60		
							41.60 1.25 1.90	21675	Genuine.
							40.61 40.04		

## MEMORANDA ON MANURES.

Since this publication is intended for circulation among our farmers, it has been thought advisable to take advantage of its issue by reprinting some of the notes which have appeared in former bulletins, and adding a few additional particulars from works which have recently appeared, regarding the application of natural manures and artificial fertilizers.

It is nearly fifty years since Stockhardt, at that time professor in the agricultural school of Tharandt, Saxony, said that a farmer who bought guano, bonemeal, or other artificial fertilizers, and at the same time neglected to make proper use of the dung of the cattle on his own farm, must be regarded as an agricultural spendthrift. Every intelligent farmer in Canada will in these modern days agree with the old German professor, and maintain that the treasury of the farm is the dungstead, and that leaks and emanations from it of valuable fertilizing constituents must lead to financial embarrassment and possibly ruin.

This statement may be positively made without in the slightest degree detracting from the merits of artificial fertilizers, for when properly selected and applied, their value becomes abundantly evident. The question as to whether their use is remunerative has been frequently discussed, and depends to a large extent on the care employed in their selection. Supposing that the intelligent farmer has considered composition, cost, &c., to the best of his ability, made his selection and applied the fertilizer, he may still be in doubt as regards the result unless he takes steps to make a manure trial with it. As regards the best way of doing this, Hellriegel, in a publication, dated 1897, has related his experience. He recognizes how difficult it is for practical agriculturists, fully occupied with their regular work, and engaged in meeting all the difficulties caused by workmen, weather and market rates, to carry out regularly planned manure experiments. He therefore describes a method which experience in his estimation had justified, and recommends it for the purpose of ascertaining whether any application of lime, marl, dung or fertilizers had really produced the improvement which from the point of view of cost had been expected. This plan is to pass over, at one or several places, properly selected, a few square rods of the field without applying the dung or fertilizer. In this way unmanured plots, which do not require to be measured with great exactitude, but merely paced, and do not need to be harvested separately, are left in the manured field, by means of which any improvement in the latter may be remarked and valued.

This plan exacts that it should be possible to see a distinct difference between the unmanured plots and the manured field, not only as regards the height and density of the resulting crop, but also in reference to the fullness of the ears and the development of the grains. In the event of such a distinct difference being invisible the manure is justly discredited as unfit for its intended purpose. It would seem advisable to recommend this plan to farmers who use fertilizers, because some of them may manure the whole field, fail to see any improvement on account of being unable to make comparisons, and perhaps condemn the fertilizer unjustly. The simplicity of the plan above described, and its applicability everywhere and every year would appear to commend it to the practical agriculturist. At the same time it is necessary to remark that there are instances on record of fertilizers having been applied and remaining utterly without effect owing to some defect in the soil. Such defects have often been cured by a previous application of marl or lime, which not only produced good effects themselves, but improved also the action of the fertilizers afterwards applied.

## THE CARE OF NITROGEN.

This element is the most valuable of fertilizing constituents, and one which is exceedingly liable to loss.

In many of the fertilizers described in this and former reports their cost is very much increased by the admixture of nitrogenous constituents. This cost farmers might save by properly caring for the stock of nitrogen on their farms and this stock might even be increased by cultivating those crops which have the power of appropriating the

nitrogen of the atmosphere. Nevertheless, the fertilizer manufacturers still seem to be under the necessity of supplying this element in considerable quantity in their goods, and of charging for it. In the case of the mixed fertilizers, this extra charge varies from \$8 to \$14 per ton, which the farmer must pay if he purchases, and which he can readily save in his own stables, or produce upon his own farm.

Nearly the whole of the nitrogen in the fodder fed to farm stock is to be found in the excreta of the animals, and one half of it is contained in the urine. It is further well known that 95 per cent of the potash contained in the food of cattle and sheep may be recovered by carefully saving the liquid manure only. It has, however, been ascertained that stable yard manure experiences considerable loss of its fertilizing constituents, but more especially of nitrogen, when left to itself in the dung heap. According to the experiments of Wolff this loss amounts to 55 per cent of the nitrogen contained in fresh manure from horned cattle. The later experiments of Heiden and Holdeweiss place it at 23.4 per cent. These results were obtained when ordinary reasonable care is taken of the manure, but give no data for estimating the loss which occurs when, as is very frequently the case in Canada, the manure is treated with the grossest neglect. It is safe to assume that, generally, 50 per cent of the nitrogen contained in the barn-yard manure of this country returns unutilized to the atmosphere, or is otherwise lost by careless treatment. Supposing that an average quantity of 36,000 lbs. is produced in fresh condition annually by each animal, and that it contains 0.4 per cent of nitrogen, it follows that a loss of 72 pounds of nitrogen, worth \$8.64, takes place for each head of cattle. This loss can be prevented by daily strewing the stables with 2 lbs. of ground plaster for each animal, which at once prevents any smell of ammonia from arising in the stable. The quantity prescribed means 700 lbs. or a cost of about \$2.50 annually for each 1,000 lbs. live weight, but, by adopting this plan, the farmer would to a great extent be relieved from the necessity of purchasing the nitrogen of artificial fertilizers.

In a pamphlet published by Vieweg in 1859 entitled "Ein Pfund Stickstoff kaum einen Groschen," which may be freely translated "a pound of nitrogen for a penny," Dr. Meyer-Altenberg maintained that ground gypsum is the very best preservative of barn-yard manure when applied in the stable, because it secures "certainty and completeness of effect, ease of execution, and the lowest possible cost." He further described the effect of its application on the domain of Beberbeck in Hesse, and other impoverished farms, showing that it is possible to bring such into a fertile condition, without the purchase of manure or fertilizers or feeding stuffs, excepting a little straw for bedding and oats for the horses.

#### TREATMENT OF STABLE-YARD MANURE.

Dr. Meyer-Altenberg, in the little work above mentioned, takes care to point out that the use of gypsum, without subsequent careful treatment of the dungheaps, does not give the desired effect, and he dwells on the importance of having the manure thoroughly trodden down, and made as compact as possible. This is also shown in Dr. J. König's prize essay 'How can the farmer preserve and increase the stock of nitrogen on his property?' (Berlin, 1887.) In a special chapter of this work the author discusses 'The evolution of free nitrogen during the fermentation and storage of stable manure,' describes the experiments which were made from 1860 to 1885 regarding its treatment and gives finally the results of the discussion from which the following sentences may be translated with advantage:—

1. In the decomposition of nitrogenous substances of every nature a loss, more or less considerable, of free nitrogen takes place.
2. This loss is the greater the more the atmosphere has access to the decomposing mass.
3. Too much moisture is just as hurtful as too little. Stable manure requires such a degree of humidity as permits its components to lie close to each other.
4. The addition of substances which fix ammonia (such as gypsum, kainite and kieserite) prevent or reduce the loss of nitrogen. These substances are, however, of little



or no value if care is not taken at the same time to prevent as much as possible the access of air.

12. In storing stable manure in dungsteads the latter must be watertight and roofed in, and the treading down of their contents by the farm animals is to be recommended.

One thing in connection with this question is perfectly certain and that is that the use of gypsum, or ordinary ground land plaster, prevents any loss of nitrogen in the stable, and while the manure is being forwarded to the dungheap. Further, if the work from which the foregoing quotations have been made be carefully studied, and also the experiments and writings of Holdeleiss, Vogel and others, it appears to be quite certain that the use of the same article, or of the gypsum produced in the manufacture of 'acid-phosphate,' completely prevents the loss of ammonia from the liquid part of the manure, and also from the organic nitrogen of the solids, provided the whole has, previous to fermentation, been made thoroughly compact, and atmospheric air almost completely excluded. Where it is found impossible to attend to the latter precautions, the safest way will probably be found to lie in avoiding fermentation altogether, by conveying the fresh manure, after treatment with gypsum, on to the field to be manured and bringing it under the soil as rapidly as possible. The latter practice has been proved to be most advantageous by the experiments which have been carried on for some time past, at the Central Experimental Farm by Director Saunders. (See Reports for 1898.)

Not only has the addition of substances which have the faculty of fixing ammonia been recommended for stable manure, but its improvement to a greater extent has been proposed by the addition of fertilizers. The following quotation is taken from Bulletin No. 45 (for March, 1897) of the Massachusetts Agricultural College, and was written by Dr. C. A. Goessmann, Chemist for that institution:—

*'The practice of adding to the manurial refuse materials of the farm as stable manure, vegetable compost, &c., such single commercial manurial substances as will enrich them in the direction desirable for any particular crop to be raised, does not yet receive that degree of general attention which it deserves'* (The italics are in the original.) An addition of potash in the form of muriate or sulphate of potash, or of phosphoric acid in the form of fine ground South Carolina or Florida soft phosphate, &c., will in many instances not only improve their general fitness as complete manure, but quite frequently permit a material reduction in the amount of barn-yard manure ordinarily considered sufficient to secure satisfactory results.

'Average composition of seventy-five samples of barn-yard manure:—

	Per cent.	Lbs. per ton.
Moisture.....	67.00	1,340.0
Nitrogen.....	0.52	10.4
Potassium Oxide.....	0.56	11.2
Phosphoric Acid.....	0.39	7.8

The average barn-yard manure contains, it will be noticed from the above statement, a larger percentage of nitrogen, as compared with its potash and phosphoric acid than is generally considered economical. An addition of from thirty to forty pounds of muriate of potash, and of one hundred pounds of fine ground natural phosphate (soft Florida or South Carolina floats) per ton of barn-yard manure would greatly increase its value as an efficient and economical general fertilizer.'

These are no doubt most excellent suggestions, and there is no reason why these substances should not be introduced into the stable manure in the same manner as in the case of the ground plaster above mentioned. Plain superphosphate and kainite might also be used, some of the constituents in which would be useful in fixing the ammonia, as soon as formed from the organic nitrogen. Should this suggestion be found to have practical value, there is no doubt that our fertilizer manufacturers would be found able to supply our farmers, at a very moderate cost, with a mixture of ground plaster, superphosphate and kainite, in such proportions as experience might show to be most advantageous. No better application can be made of the wood ashes produced in

the farmer's household than by mixing them with the barn-yard manure, and most excellent results are known to have followed this practice.

#### ACQUISITION OF NITROGEN.

Not only can the farmer save almost the whole of the nitrogen contained in the fodder fed to his cattle, but he can actually increase the stock of it stored away in his fields, agricultural products and manure heaps by a judicious course of crop rotation. For more than a century agricultural chemists discussed the question as to whether free atmospheric nitrogen can be assimilated by plants, but it may now be regarded as perfectly settled in the affirmative, if regard is had only to the plants of the order leguminosae, such as beans, pease, lentils, vetches, clovers, alfalfa, serradella, &c. Even the great English agriculturists, Sir J. B. Lawes and Sir Henry Gilbert, who had previously been of an opposite opinion, have now admitted that this appropriation of nitrogen has been completely proved. This acknowledgment was made by Sir Henry Gilbert at a great meeting of agricultural chemists held at Halle, in Germany, in September, 1891. Thus, modern research has confirmed not only modern agricultural practice, but also the experience of antiquity, for Prof. W. Strecker has pointed out a passage in Pliny which says: 'Lupines require so little manure that they in fact replace it; vetches make the land more fertile. Corn should be sown where previously lupines or vetches have stood, because they enrich the land.'

It is not, however, to be supposed that this utilization of atmospheric nitrogen by leguminous plants can take place upon very poor soils or upon those destitute of the inorganic constituents which they require. The latter must in such cases be supplied in the shape of potash with some phosphoric acid, as was done with great success by Schultz, of Lupitz, a practical agriculturist in North Germany. In fact, had it not been for his investigations, the controversy above referred to might have continued without results up to the present hour.

Professor König, of Münster, gives the following summary of Schultz's experience:—

'Schultz acquired the farm Lupitz in the year 1855; its soil consisted of a poor, cold, diluvial sand; the profit in working it was very small. Lupines yielded indeed as fodder tolerable results, but when used as green manuring for rye and oats, no return was obtained from them. The application of artificial manures produced good crops, but they did not pay; burnt lime showed itself to be too heating. The use of manure was more favourable, especially when fertilizers containing phosphoric acid were used at the same time. But at the best the total result was not satisfactory.'

'Shortly after Schultz acquired Lupitz, the great discovery of potash salts was made, and about 1860 they began to be produced from the mines of Stassfurth. Schultz made up his mind to try them as manure and he obtained the most surprising results. After lupines had shown themselves to be useless as forerunners of grain, they were excluded from the rotation and grown on a separate field without any manuring and alternating with sheep pasture. But the harvest on these became worse and worse until the field in question became quite lupine 'sick.' Schultz made his first trial on this field, manuring it with 500 pounds kainite per morgen (1 Prussian morgen = 0.631 acre); the sickness was at once cured, and for twenty-five years afterwards Schultz has grown lupines on this ground without interruption, always with the application of 300 pounds kainite. Schultz obtained similar good results on the ground which had received the marl, by the application of potash salts. This ground had indeed yielded well with lupines for two years after the application of the marl, but in the third year they sickened here too. When, however, 300 pounds kainite were applied here and ploughed in, the ground was cured, although an application of phosphates had not produced the desired results.

'The favourable influence which the manuring with kainite or potash salts had exerted on lupines induced Schultz to try them on grain, in conjunction with phosphates. But in this case he obtained contradictory results according to the nature of the crops which preceded the grain. For instance, while grain sowed after lupines and manured with potash and phosphates yielded very good and remunerative harvests, these were not

to be obtained if grain was grown after grain or after potatoes. This behaviour of these crops was explained by Schultz in this way: that lupines or deep-rooted plants leave in the soil after harvest a residue of root, in which a considerable amount of nitrogen has accumulated, an amount sufficient to supply the wants of the following grain crops; that, on the other hand, the application of potash and phosphates to grain, after a preceding grain crop, is without effect, for the reason that the latter has consumed the stock of nitrogen. Grain crops always reduce this stock; never increase it. Schultz has given the name 'nitrogen collectors' to the lupines and similar plants, while grains are called 'nitrogen consumers.' His system of rotation is therefore the following:—Sow first nitrogen collectors (lupines, pease, beans, vetches, clover, lucerne, serradella, &c.), or, as they have been called, renovating crops, and give them 300 pounds kainite per morgen, with perhaps an addition 20 pounds phosphoric acid. After harvesting the nitrogen collectors, sow a nitrogen consumer, raising a grain or exhausting crop, giving it also 300 pounds kainite and 20 pounds phosphoric acid. The grain crop is perfectly successful, because the first crop left behind it nitrogen enough to supply the wants of the grain. In this way the keeping of stock, which is expensive on a poor sandy soil, can be reduced and the purchase of nitrogenous fertilizers dispensed with, because the nitrogen collectors are able to stock the soil with that valuable element.

The foregoing description is taken from Professor König's "Stickstoff Vorrath," published in 1887 (Paul Parey, Berlin). It was in 1884, nearly thirty years after the purchase of his sandy farm, that Schultz, of Lupitz, published the results of his experience, although they did not contain anything very new and although they only confirmed experiences still older than his own. But his case was surprising and his explanation of the cause of his successful farming challenged the attention of scientific agriculturists. The consequence has been the issue of many pamphlets on the subject, and an activity in the region of agricultural experimenting which is not yet ended. Atwater, Wagner, Heiden, Hellriegel, and many others have participated in these investigations, and Professor Wood, of the Storrs Agricultural School in Connecticut, has given the following general conclusions as the result of the work:—

1. "Pease, alfalfa, serradella, lupine, clover in all probability, and apparently leguminous plants in general, are able to acquire large quantities of nitrogen from the air during their period of growth.

2. "There is scarcely room to doubt that the free nitrogen of the air is thus acquired by plants.

3. "That there is a connection between root tubercles and this acquisition of nitrogen is clearly demonstrated. What this connection is, what are the relations of micro-organisms to the root tubercles and the acquisition of nitrogen, and in general how the nitrogen is obtained are questions still to be solved.

4. "The cereals with which experiments have been completed have not manifested this power of acquiring nitrogen, nor do they have such tubercles as are found on the roots of legumes.

5. "In the experiments here reported, the addition of soil infusions did not seem necessary for the production of root tubercles. A plausible supposition is that the micro-organism or their spores were floating in the air and were deposited in the pots in which the plants grew.

6. "As a rule the greater the abundance of root tubercles in these experiments, the larger and more vigorous were the plants and the greater was the gain of nitrogen from the air.

7. "In a number of these experiments, as in similar ones previously reported, there was a loss of nitrogen instead of gain. The loss occurred where there were no root tubercles; it was especially large with oat plants, the largest where they had the most nitrogen at their disposal in the form of nitrates. As the gain of nitrogen by the legumes helps explain why they act as renovating crops, the loss in the case of the oats suggests a possible reason why they should appear to be an exhausting crop.

Practical inferences:—The ability of legumes to gather nitrogen from the air helps to explain the usefulness of clover, alfalfa, pease, beans, vetches and cow pease as renovating crops, and enforces the importance of these crops to restore fertility to ex-

hausted soils. The judicious use of mineral fertilizers (containing phosphoric acid, potash and lime) will enable the farmer to grow crops of legumes which, after being fed to his stock, will, with proper care to collect and preserve all manure, both liquid and solid, enable him to return a complete fertilizer in the shape of a barn-yard manure to his land. A further advantage of growing these crops is that the nitrogenous material, protein, which they contain in such great abundance, is especially valuable for fodder.

From the foregoing it seems that, in the present condition of our knowledge, the conclusion may be drawn that the atmosphere stands ready to furnish the farmer, gratis, with all the organic constituents which his crops require, provided always that he, on his part, will exercise a sufficient amount of skill and intelligence in appropriating and retaining on his farm the fertilizing materials, and especially the nitrogen. If he does this, all that is necessary for him to provide, in order to replace the losses which his farm sustains from the sale of stock or produce, are the inorganic or mineral constituents of these, and especially the phosphoric acid and potash. There is much in all this to remind one of Sprengel and Liebig's teaching of fifty years ago, according to which a plant cannot thrive if its soil does not contain all the substances which are to be found in its ash.

#### UTILIZATION OF SEWAGE.

The losses in fertilizing material which are sustained, as above mentioned, on account of the neglect or unscientific treatment of barn-yard manure, are very trifling when compared with those which the community suffers in the almost total loss of the nitrogen, phosphoric acid and potash contained in human excreta. The utilization of such always becomes a subject for discussion when the question is raised as to how a cheaper class of manures than the artificial fertilizers can be obtained for use in agriculture.

Where the water carriage system of removing sewage and excrement has been introduced, nothing is to be hoped for in the recovery of their fertilizing constituents. Even in cases where, at large expense, establishments have been erected for the treatment of sewage by precipitation or similar methods, the products have been found to be entirely destitute of agricultural value. The greater part of the fertilizing constituents of sewage are in such a soluble condition, and have been diluted with water to such an extent, as to render their recovery economically impossible. It has been attempted in the neighbourhood of many cities in England and on the continent of Europe to use the sewage for irrigation and as liquid manure, but this method of utilization has been found to be in the highest degree imperfect. At Berlin it has been proved, that of the nitrogen contained in its sewage, at the very most only 13·8 per cent is found in the agricultural products of all the magnificent farms irrigated by it in the neighbourhood of the city. When the use of water for removing house refuse is excluded, and ordure and urine are removed as manure in their natural state, their utilization is possible, and is made a source of revenue in such towns as Stuttgart, Groningen, Greifswald, &c. But the systems of this class which are in use have all their disadvantages, as is proved by the tendency which municipal authorities constantly show to adopt the water carriage system. The greatest disadvantage under which these systems labour is the difficulty caused by the offensiveness to sight and smell of the material with which they have to deal. This has been entirely met by the use of moss litter as an absorbent, deodorizer, and disinfectant.

#### MOSS MANURE.

The first public mention of the usefulness of moss litter as a deodorizer and absorbent seems to have been made by Dr. Ludwig Happe, in Braunschweig, in December, 1880, since which time its application for the purpose has gradually increased until now, when the system has been introduced into several towns in Germany, and is also practised in Congleton, Cheshire, England. In Canada this method of deodorizing human refuse has been in use for years at Caledonia Springs. It, of course, at once

recalls the dry earth system regarding which great expectations were at one time entertained. The advantages of moss litter over dry earth for the purposes in question are, however, very decided. They consist in the perfect inoffensiveness of the moss litter product, in the fact that one part of moss litter will deodorize and dry at least six parts of mixed excreta, and in the greater agricultural value of the resulting manure. Dry earth (which is required in quantity at least equal to that of the excreta) is valueless from an agricultural point of view, but this is not the case with moss litter, which as its analyses show, often contains as much nitrogen as ordinary barn-yard manure. Numerous analyses have been made of moss litter manure as produced in Germany, and its average contents from seven different towns may here be stated.

	p. cent.	lbs. per ton.		Value per ton.
Nitrogen.....	0.664	13.28	at 13c.	\$1 72
Phosphoric acid.....	0.350	7.00	5	0 35
Potash.....	0.285	5.70	5½	0 30
Water.....	83.00			\$2 37

Numerous trials have been made on various crops with this manure, and very satisfactory results are always reported. In all cases it is stated to excel barn-yard manure even when the latter is used in much greater quantity.

Canada possesses in its bogs and swamps inexhaustible quantities of moss litter which is frequently found in beds, several feet in thickness lying above the peat. The following tests have been made in the Inland Revenue Laboratory, of moss litter from various localities in the Dominion:—

	Moisture.	Ash.	Nitrogen.
	p. c.	p. c.	p. c.
Moss litter, Berwick, N.S.....	14.40	1.16	1.26
Black muck, Berwick, N.S.....	13.30	3.68	1.58
Moss from Great Village, N.S.....	63.44	3.46	0.63
Sphagnum moss from Shippegan, N.S.....	12.45	1.55	0.55
Light coloured moss litter from Lincoln Parish, N.B.....	11.55	1.40	1.79
Dark coloured sample from the foregoing locality.....	10.95	0.80	1.06
Moss litter from Musquash, N.B.....	11.50	0.95	0.82
Moss litter from lower layer.....	12.50	0.90	0.72
Peat from St. Bridget, P.Q.....	13.30	2.50	1.48
Peat from St. Hubert, P.Q.....	12.35	2.68	1.84
Light coloured moss litter from Caledonia Springs, Ont.....	10.00	1.60	2.95
Dark coloured moss litter from the same locality.....	11.60	2.70	2.23
Peat from the same locality.....	10.95	3.90	2.94
Surface moss from the Mer Bleu at Eastman's.....	10.85	2.80	0.71
Surface moss from the Mer Bleu at Baldwin's Farm.....	7.90	2.66	1.47
Surface moss from the Mer Bleu at Baldwin's Farm 18 inches deep.....	27.90	1.72	1.64
Peat from Mer Bleu at McFadden's Farm, Navan, wide ditch.....	22.60	4.40	2.21
Peat from Mer Bleu at McFadden's Farm, Navan, narrow ditch.....	9.40	6.62	2.80
Peat from near Stratford, Ont.....	16.80	9.10	1.91
Hypnum moss from the Ellice bog, Stratford, Ont.....	8.75	9.72	2.01
Moss litter from Welland marsh, Ont.....	3.85	4.70	1.51
Peat lying underneath the foregoing.....	5.30	4.85	1.41
Peat from same locality, 4½ feet deep.....	3.25	41.25	1.52
Peat from Dobson's bog near Beaverton, Ont.....	18.42	9.04	1.80

The manufacture of moss litter has been attempted at Musquash, in New Brunswick, and also in Welland County, Ontario. From the latter locality I was supplied with several bales of the moss litter for experimental purposes, and Dr. Laberge, of Montreal, undertook to superintend the carrying out of an experiment to determine its deodorizing and absorbent qualities. He reported that 100 pounds of moss litter were



sufficient for drying 800 pounds of ordinary excreta from privy pits in Montreal, and rendering it entirely inoffensive. A sample of the product remained for days in my office without attracting notice, and indeed it was quite devoid of odour. Its analysis gave the following results:—

	Per cent.	Pounds per ton.		Value per ton.
Nitrogen.....	1·31	26·2	at 13c.	\$3 41
Phosphoric acid.....	0·90	18·0	at 5	0 90
Potash.....	0·14	2·8	at 5½	1 15
Water.....	65·47			<hr/> \$4 46

The valuation of ordinary fresh barn-yard manure with 75 per cent of water is about \$2 per ton; with 67 per cent water, as in the case of the average given above by Dr. Goessmann, the value is nearly \$2.25. Therefore, much better results might be expected agriculturally from a 'moss manure' of the composition just described.

These facts are reported in order to show that Canada possesses in her waste lands abundance of material which might be used in our towns and villages for the production of a very valuable manure, with the simultaneous introduction of very many sanitary advantages. It is not to be expected that cities or towns which are advantageously situated for the water carriage system, or which have already adopted it, will make any changes, but there are many towns and villages in the Dominion where the application of the moss litter system would be very suitable, and the authorities of which, by selling the product or giving it gratis to the farmers of the neighbourhood, might confer a great advantage on agriculture.